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ABSTRACT

Designed chiefly for the growing number of technical and business writing teachers in two year colleges, this collection of articles helps teachers understand technology and business students so that they can teach courses that satisfy the writing needs of those students. Written by practicing teachers or writers, the articles offer viewpoints on central issues. Principal assignments in freshman and sophomore courses in technical and business writing are given primary emphasis. Because of their multidisciplinary orientation, many of the selections are presented as resources for teachers in writing-across-the-curriculum programs. The articles are divided into six parts, arranged essentially in the order that teachers would use the materials. Each part addresses a central concern of teaching technical and business communication in two year programs: (1) preparing to teach the subject for the first time, (2) designing the basic course, (3) broadening the basic course or designing a program, (4) developing classroom strategies, (5) constructing effective assignments, and (6) teaching report writing. The book ends with an extensive bibliography of resources designed to help teachers of technical and business writing grow as professionals. (HTH)

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Technical and Business Communication in Two-Year Programs

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Contents

Preface ix

Part One: Gearing Up

1. Toward More Effective Technical Writing Courses 3
James A. Reinking and George Abraham

2. The Professional and Psychological Preparation of New Teachers of Business and Technical Writing 10
Laura H. Weaver

3. Distinguishing Characteristics of the Technical Writing Course 16
Harriett Hogan

4. Understanding the Rhetoric of Scientific Writing 22
Thomas M. Sawyer

Part Two: Developing the Basic Course

5. You, Too, Can Teach a Relevant Course in Technical Writing 35
James W. Hill

6. A Comprehensive Skills Approach to Course Design 44
Terry Skelton

7. The Graduate Survey and Its Role in Course Revision 55
Terrence J. Glenn and Marcus M. Green

Part Three: Broadening the Basic Course

8. Writing: An Institutionwide Approach 69
Gladys W. Abraham

9. Establishing a Technical Communication Program at the Two-Year College 76
Charles E. Albrecht and Leigh S. Bark

10. Public Communication Internships: An Outlet for Technical Writing 84
Charles R. Duke

Part Four: Developing Classroom Strategies

11. The "Business" of Communication Courses: A Simulation Approach 91
David H. Covington

12. Writing on the Job: Communication as Design 96
Ron Carter

13. Using Toulmin Logic in Business and Technical Writing Classes 103
Kitty O. Locker and Michael L. Keene

14. Zen and the Art of Business Letter Writing: Teaching "Bad-News" Strategies 111
Ron Dulek

15. An Alternative: The Student Journal 116
Ron Dulek and Annette Shelby

16. The Neglected Periodic Sentence 121
Don Bush

Part Five: Constructing Effective Assignments

17. Teaching the In-House Memo to Technologists 127
Eugene W. Etheridge

18. The D.M.I. Letter: A Case Study 136
Chester L. Wolford

19. Teaching the Description of a Specific Mechanism 140
Thomas L. Warren

20. Developing and Presenting Library Instruction for Technical Writing 147
Elizabeth Tebeaux

Part Six: Reading and Writing Reports

21. The Minireport: An Alternative to Formal Reports in Basic Business and Technical Writing Classes 159
Kitty O. Locker

22. The Poster Session: An Alternative to the Oral Report 165
Gail W. Pieper

23. The Importance of Summaries and Their Use in the Applied Writing Class 169
William E. Rivers

24. Analysis of Professional Periodicals: A Recommendation Report 176
Stephen Gresham

Part Seven: Growing as a Professional

25. Resources for Teachers of Business, Technical, and Vocational Writing 181
Carolyn R. Miller and Bertie E. Fearing

Contributors 201

Preface

As its title suggests, this book is designed chiefly for the growing number of technical and business writing teachers in two-year programs—in technical institutes, junior and community colleges, and the lower divisions (associate degree or certificate-granting programs) of four-year colleges and universities. This book, the third sponsored by the NCTE Committee on Technical and Scientific Communication, is intended to complement and expand upon the two previous essay collections that were designed chiefly for upper division courses in four-year institutions (*The Teaching of Technical Writing*, edited by Donald H. Cunningham and Herman A. Estrin, and *Courses, Components, and Exercises in Technical Communication*, edited by Dwight W. Stevenson).

From the many items submitted for consideration in response to our national call for papers, eight veteran teachers of lower division technical and business writing courses carefully selected twenty-five best suited to the audience and purpose of the book. We are grateful to this referee board and wish to acknowledge their service here: Deborah C. Andrews, Drexel University; David E. Fear, Valencia Community College; Roy A. McGalliard, Western Piedmont Community College; Roger Easom, Federal Express-Memphis; Ann A. Laster, Hinds Junior College; Thomas E. Pearsall, University of Minnesota. While many of the selections will prove useful to teachers of upper division courses in four-year programs and some to teachers in secondary schools with technical writing programs, the collection is addressed directly to teachers in two-year programs.

The book is divided into seven parts, arranged essentially in the order that teachers would use the material. Each addresses a central concern of teaching technical and business communication in two-year programs: (1) preparing to teach the subject for the first time, (2) designing the basic course, (3) broadening the basic course or designing a program, (4) developing classroom strategies, (5) constructing effective assignments, (6) teaching report writing, and (7) developing further as a teacher of technical and business writing. This collection, in keeping with the stated functions of the Committee on Technical and Scientific Communication, should help teachers understand students from technology and business and teach courses that satisfy the writing needs of those students.

Several special features should be especially helpful to teachers of work-related writing courses. For example, since each item was written especially for this book by practicing teachers or writers, the material offers fresh, realistic viewpoints on central issues. Moreover, principal assignments in freshman and sophomore courses in technical and business writing are given primary emphasis. And the book ends with an extensive, up-to-date bibliography divided into professional organizations, institutes and workshops, journals, teacher preparation material, textbooks for lower division courses, and standard reference works—virtually all the resources needed by developing teachers. Finally, because of their multidisciplinary orientation, many of the selections can also serve as resources for teachers in writing-across-the-curriculum programs.

These special features should provide teachers in two-year programs with welcome assistance in the teaching of career-related writing. And the contagious enthusiasm found in these selections ought to encourage teachers to continue growing as professionals in the field of technical and business communication.

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Part One: Gearing Up

1 Toward More Effective Technical Writing Courses

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Both novice and veteran technical writing teachers in the two-year college face impediments—pedagogical and administrative—that impair classroom effectiveness. These problems must be eliminated if students are to receive quality instruction. Much of the conflict can be resolved when technical writing teachers and instructors from the various technical departments of the college exchange ideas on the most productive ways to improve the communication skills of their students. This cooperation will produce positive results for teachers, students, and employers and at the same time enhance the reputation of the institution as one that turns out students who write competently.

The number of technical communication courses being taught in community colleges across the country continues to increase as employers, particularly those in business and technical fields, insist that the graduates they hire know how to write. Employees on all organizational levels, they point out, must write on the job. The company owner who submits a proposal, the vice-president who sends memorandums, the engineer who prepares a progress report, the purchasing agent who drafts a claim letter and the sales manager who answers it, the mechanic who notifies the manufacturer through a recommendation report that a customer's automobile should be repaired under warranty—each is using a specialized kind of technical communication. This rapid growth in technical writing courses has been accompanied, as one might expect, by a number of pedagogical and administrative problems.

Some of these problems are well known, and efforts to solve them are underway on many fronts. Various teacher training programs now specialize in preparing instructors to teach English to community college students, many of whom enroll in technical communication. The annual meetings of MLA, NCTE, and CCCC now include numerous sessions on technical writing as do regional conferences and workshops.[1] Journal editors are publishing more articles on technical communication (*The Technical Writing Teacher* focuses exclusively on such articles), and a number of recent essay collections offer guidance to both experienced and inexperienced teachers.[2] Nevertheless, unresolved problems exist, some of which extend beyond the classroom and reflect the attitudes of community college faculty and administrators. A discussion of these difficulties and how they might be overcome should prompt some reevaluation of technical English offerings at the two-year college.

Pedagogical Problems and Solutions

Responding to the demand of business and industry for employees who can write, community colleges are requiring more of their students to complete technical writing courses. The supply of teachers trained in the field, however, does not come close to meeting the demand. And with budgetary belt-tightening the order of the day, recruiting experienced technical writers from industry is not economically feasible. Enter the community college English department.

Most English teachers at community colleges received their major training in literature, and thus may not be adequately prepared to teach writing, especially technical writing.[3] When they are assigned to teach technical communication, they are often troubled by their unfamiliarity with this sort of writing. The word *technical* itself can generate feelings of apprehension in those whose acquaintance with science is limited to a required undergraduate course in biological or physical science. Some instructors fear that they will be unable to build a meaningful course around functional writing assignments, to comprehend technical terminology, and to follow a technical process. These doubts lead to the uneasy feeling that constructive evaluation of student papers may be hard to provide. Add the prospect of facing a heterogeneous class that will write papers in such diverse fields as construction technology, auto mechanics, printing, electronics, and environmental health, and it becomes clear why some English instructors view the technical writing course with trepidation.

Variations of the team-teaching concept can help to dispel these fears. Conferring with instructors from the various technical departments of the college about writing assignments and inviting them into the classroom to tell students the importance of on-the-job writing will facilitate lesson planning and enhance student willingness to learn. Then, too, technical instructors are in an ideal position to suggest writing assignments related to their classroom and laboratory instruction. Such contacts between writing teachers and teachers in other fields lay the groundwork for the type of collegiality that fosters interdepartmental cooperation. The English instructor who needs an explanation of a technical term or concept and the electronics or accounting instructor who would like to discuss options for organizing a report can then easily obtain the desired information through a quick phone call or visit.[4]

Unfortunately, some English teachers, guided by theory, and some teachers from technical departments, guided by on-the-job experience, view each other with skepticism. Technical instructors often feel that the English department's technical writing course should focus more directly upon the specialized types of writing demanded in the world of work. At the same time, they may hesitate to seek a change in emphasis from those who lack technical backgrounds. Many English teachers, on the other hand, are wary of venturing into the complex world of technology and consequently cling to variations of the familiar. Others, perhaps out of professional pride, are reluctant to ask instructors in other departments for direction. When both technical instructors and English instructors hold their ground, the writing program founders and the student is shortchanged.

Both groups of instructors must bury parochial attitudes and pool their talents in order to solve the problem. Technical instructors should recognize that their English colleagues can indeed apply their knowledge and skill to improve the communication skills of students, thus enhancing their attractiveness as employees. By the same token, English teachers should view technical writing as a service course and thus accept guidance from the people they serve.[5] Only through such cooperation will the needs of students and employers be met.

In addition to interdepartmental contacts, technical English teachers should meet periodically to pool instructional resources. Some instructors have prepared lists of media materials for teaching the career-oriented student. Others have developed instructional packets that include detailed lesson plans and methods of evaluation. Still others have taken graduate courses in technical English at nearby universities. Regular meetings allow instructors to compare and agree upon course objectives, classroom procedures, and ways of evaluating student performance, as well as to share the latest research in the field. These sessions can be quite informal, or they can take the form of organized seminars and workshops and involve outside consultants.

Finally, technical English instructors should request that part of the annual English budget be allocated to professional development. They might, for example, attend regional conferences; enroll in workshops or seminars; consult journal articles, essay collections, and dissertations; and visit community colleges with successful programs. By drawing upon the resources available to them, instructors can compensate for their lack of formal training in the teaching of technical writing.

Administrative Conflicts and Solutions

On the administrative level, technical writing can become a political football, with conflicting interests battling for control. This conflict often stems from the organizational model of the college, which designates reporting lines: faculty report to a department head, the department head reports to the division head, the division head to the dean, the dean to the vice-president or president. The technical English course, however, raises troublesome questions. Technical courses fall under the administration of the technical and applied arts dean, but the English department traditionally falls under the jurisdiction of the general education dean. Who then supervises technical English? Who determines the number of sections to be taught, where they will meet, and for whom they will be taught? Who makes decisions about course content and staffing? How administrators answer these questions has considerable impact on the nature and quality of the course.

Industry frequently seeks the expertise of two-year college faculty in order to upgrade employee writing skills. Typically, a company's training director contacts the technical dean, who is, therefore, likely to favor scheduling a considerable number of technical writing sections. When the dean transmits the request to the general education dean or to the chair of the English department, however, the request does not always receive a favorable response. Some English instructors object to large numbers of technical writing courses because they reduce the opportunity to teach conventional rhetoric or writing about literature. This situation poses a particular dilemma for the

English chair, who must be sensitive to departmental opinion and at the same time accommodate the scheduling requests of the technical dean. At this point, factors for administrative conflict surface.

When the conflict is unresolved, technical deans sometimes hire their own faculty to teach English to technical students. Such a move has two unfortunate consequences. First, hiring "independent" writing teachers reinforces barriers that may exist between English instructors and instructors in technical departments. Second, technical writing offered outside the English department is generally nontransferable. Students who take such a course and then transfer to a four-year college will likely be asked to repeat English. A better solution for students and staff is to encourage the English faculty to teach any technical writing course offered by the college, but at the same time to secure for them the advice and expertise of their colleagues in technical departments. The English instructor and the technical instructor must fully cooperate to meet the needs of students and the community.

A second source of administrative conflict is the matter of uniform standards. The fact that technical students have specialized writing needs should not exempt them from the writing competence expected of nontechnical students. If uniform standards are required, members of the English faculty will be less likely to formulate faulty generalizations about the writing ability of technical students. The English department should establish an equitable placement system that directs students into appropriate courses. All entering students should take the institution's placement test. Based on the results, each should be assigned to the appropriate level, from developmental through honors, *regardless of major or career aspirations.* Students at the developmental level should prove themselves capable before advancing to technical English, which may consist of a two-semester or three-quarter composition sequence or be a special course following the regular composition sequence.[6] Treating all students equally establishes the reputation of the institution as one that turns out students who write competently.

Implications

The implications of effectively designed technical writing courses extend beyond the community college. The public, aided by vigilant news media, is increasingly mindful of the writing skills demonstrated by today's graduates. All too often those who provide funds for higher education—whether as members of legislatures, corporations, or foundations—have been dissatisfied with the return on their investment. Politicians campaign on the platform of minimal standards and competency testing, legislatures enact accountability programs, and employers carry their complaints to college administrators. In extreme cases, voters curtail college budgets by voting to reduce the property tax, a traditional source of educational support.

These realities cannot be ignored by technical writing teachers in the two-year college. Technical English is one of the growth fields in higher education and will come under the same public scrutiny that has led to harsh judgments of some traditional freshman composition courses. To forestall similar problems, technical writing teachers and administrators alike should consider the advantages of a program that combines the best efforts of the English and technical departments. Only then will students acquire the writing skills that enhance their employability and enable them to meet on-the-job demands. And this competence is one of the prime ways that American society measures faculty achievement and institutional responsibility. F. H. MacIntosh, speaking with conviction and perception, states it well:

> Career-oriented writing is . . . highly prized by the society which supports us—in fact, so highly prized that if we are to survive the increasing attacks upon our integrity and credibility we must concern ourselves, first and foremost, beyond all our other legitimate concerns, with the world's first expectation of us: producing in our students genuine competence in the sort of spoken and written language required in the world's work.[7]

Notes

1. For a description of one of these workshops, see Dawn L. Wakefield and Merrill D. Whitburn, "The Texas A&M Technical Writing Workshops," *The Technical Writing Teacher* 6 (Fall 1978): 19-21. The most recent and newest workshop as of the writing of this article is sponsored by the Southeastern Conference on English in the Two-Year College and is called the Institute in Technical Communication. It is held annually in Gulf Park, Mississippi, in June.

2. See, for example, *Courses, Components, and Exercises in Technical Communication*, ed. Dwight W. Stevenson (Urbana, Ill.: National Council of Teachers of English, 1981). For an exhaustive list, see Part Seven of this anthology.

3. Carl H. Klaus, chair of the 1979-80 University of Iowa Institute on Writing for directors of freshman composition, points out that most freshman writing directors also lack training in writing. See "The Word Is Write, Write, Write at Iowa," *The University of Iowa Spectator* 12 (April 1979): 5.

4. For a discussion of the interdepartmental approach, see Joyce Swofford, "Plan Your Technical Writing Course with the Help of Technical Instructors," *Teaching English in the Two-Year College* 2 (Fall 1975): 35-36.

5. Juanita Williams Dudley, "Attrition—How to Regard It and What to Do about It," *The Technical Writing Teacher* 6 (Fall 1978): 10-11, argues that attrition in technical English is often due to the unwillingness of instructors to regard technical writing as a service course.

6. Some colleges offer technical English as a one-quarter or semester course following the regular composition sequence. Technical English in the two-year college, however, is most effective when offered *through* the freshman composition sequence. Students enrolling in the "technical approach" to English Composition I and II (or III, if the quarter system is used) satisfy their graduation requirements and have no transfer problems if they continue at a four-year college.

7. F. H. MacIntosh, "Teaching Writing for the World's Work," *Teaching English in the Two-Year College* 2 (Fall 1975): 8.

2 The Professional and Psychological Preparation of New Teachers of Business and Technical Writing

Laura H. Weaver
University of Evansville

When English teachers turn from the teaching of literature to the teaching of business and technical writing to first- and second-year college students, priorities change. Instructors may be concerned at first about professional and psychological preparation; however, as they prepare professionally, they become psychologically ready. As they gain new skills and perspectives, they come to appreciate the merit and practicality of the subject and develop an increased respect for disciplines outside the humanities.

When traditionally trained English teachers begin to teach business and technical writing to first- and second-year college students, they change their priorities and often discover new interests. Instead of picking up an article on the divided self in Mary Shelley's *Frankenstein,* they ask a clerk in a hardware store for an extra copy of the instruction manual for a standard 83-052 welding torch. Instead of praising a perceptive student essay on the journey motif in Conrad's novels, they admire a clear letter of complaint, a report on a field trip, or a feasibility study of a synthetic rubber floor for a high school gymnasium. These teachers enjoy teaching not only future English teachers, musicians, and painters but also students who have worked in grain elevators and auto repair shops and who are enrolled in two-year programs in secretarial administration, data processing, and radiologic technology.

New teachers of business and technical writing often worry that their professional and psychological preparation will prove inadequate. Since their most apparent deficiency is lack of training, they should set about to rectify it by reading textbooks, collecting samples of business and technical writing, and talking to experienced teachers of technical writing. New teachers soon discover that they need not be apprehensive about psychological preparation: enthusiasm for the subject develops naturally. One type of preparation builds on the other: as teachers learn more, they become psychologically ready; and the readier they become, the more they wish to learn. A lack of interest in, and perhaps even respect for, business and technical writing usually disappears as new teachers become involved in the course. For many, the experience becomes an exciting reorientation, one often unanticipated by traditionally trained teachers of composition and literature.

Professional Preparation

New teachers of business and technical writing can obtain information and insight from written sources and through interviews or conversations with other people. Both methods are useful and should be pursued on an ongoing basis.

Written Sources

New teachers can acquire the background and perspective they need by reading books and journals on technical writing. There is the *Journal of Technical Writing and Communication* and *The Technical Writing Teacher*. Among the many useful professional books are Thomas E. Pearsall's *Teaching Technical Writing: Methods for College English Teachers* (Washington, D.C.: Society for Technical Communication, 1975); *The Teaching of Technical Writing,* edited by Donald H. Cunningham and Herman A. Estrin (Urbana, Ill.: National Council of Teachers of English, 1975); *Technical and Professional Communication: Teaching in the Two-Year College, Four-Year College, Professional School,* edited by Thomas M. Sawyer (Ann Arbor, Mich.: Professional Communication Press, 1977); and Dwight W. Stevenson's *Courses, Components, and Exercises in Technical Communication* (Urbana, Ill.: National Council of Teachers of English, 1981).

As these books and periodicals suggest, teachers need many examples of technical and business writing. To collect these materials they can rely on personal visits as well as correspondence. Public relations personnel at such local organizations as banks, hospitals, and utility companies will often supply samples. Garages and stores are other sources. From the cooperative extension service of state universities, teachers can obtain copies of papers on such widely varied topics as

"Feed Manufacturing Problems" and "Tying Down Your Mobile Home." Subscriptions to magazines like *Popular Mechanics, Scientific American,* and *Fortune* provide not only models of style but also coupons offering brochures. Teachers can also send for copies of magazines listed in *Writer's Market* and elsewhere (among others, *Bell Laboratories Record* and *Feedlot Management*). From the United States Government Printing Office are available the diverse materials listed in "Selected Government Publications." And companies will often respond to requests for samples of writing done within their organizations; some (for example, Deere & Company and Montgomery Ward) will send a variety of forms. Others send their style manuals or papers delivered by their writers, for example, two Deere & Company papers: "Communication: Some Guidelines for Clear Writing" by Bernard E. Ritzinger, Manager of Special Writing Services,[1] and "Energy: From Sun, to Plant, to Man" by Fred C. Stickler, William C. Burrows, and Leon F. Nelson. The latter paper, available in both the technical version presented in December 1975 to the American Society of Agricultural Engineers and a less technical one, helps teachers demonstrate how audience governs writing. Papers like these, by competent writers with expertise in specific technical fields, offer new teachers insight and perspective and provide useful materials for class discussion.

New teachers of business and technical writing should also explore the documents section of their college libraries. *Monthly Catalog of U.S. Government Publications, American Statistical Index,* and *Index to U.S. Government Periodicals* are representative sources of business and technical information.

Finally, new teachers will find that much useful material is already in their possession: memos from committee chairs; business letters written to untangle magazine subscriptions or replace defective products; instructions for assembling a wooden bookcase or operating a new typewriter. In addition, they can recycle past job experiences as secretaries, cashiers, and salespersons. New teachers soon discover that the practical sides of their lives can be used to enrich the business and technical writing courses they now teach.

Interviews and Conversations

New teachers also need to talk to people in technical fields. A farmer-mechanic can describe stanchions he has just installed in his dairy barn. A collector of antique machines and instructions for operating them can provide a copy of 1929 instructions for a Farmall tractor—

instructions whose style and content might be compared with that of a current manual. As the course progresses, students themselves become sources of direct and useful information. Teachers can listen and ask questions as students discuss their families and their jobs. A young man whose father has a farm implement dealership tells of the procedures involved in opening a branch in another state. A young woman employed part-time by the Soil Conservation Service while studying for an Associate of Science degree in Secretarial Administration reports on her present work and her plans for a full-time job there.

Psychological Preparation

Professional preparation, to be sure, is an ongoing process, but with technical reading and technical talk come several kinds of increased awareness—all of which help to prepare teachers psychologically for the teaching of business and technical writing. As teachers discover the range of business and technical writing, they soon begin to explore new areas with enthusiasm. New content coupled with new writing strategies often generates a fresh outlook, and many teachers find the experience a revitalizing one.

In addition to being pleased by novelty, new teachers are often intrigued by the immediate practicality of what is written. If, for example, they bring current business letters to class, students may respond by bringing business letters they have received and rough drafts of their replies. Early in the course, even before the introduction of job application letters and resumes, students often bring in drafts of their letters and resumes. This anticipation of future assignments rarely happens in the teaching of literature or in traditional composition courses.

Perhaps the most unexpected result of preparing to teach business and technical writing is an altered view of the world, especially increased respect for disciplines outside the humanities. Here the observations of several teachers of technical writing are helpful. An article by Walter James Miller and another by Roger E. Masse and Patrick M. Kelley direct teachers to scientific and technical writing of the past—in *Great Books of the Western World* and elsewhere.[2] Another suggestion, this time by Thomas E. Pearsall, fosters the change in thinking that leads to a commitment to technical writing.[3] Pearsall suggests that new teachers consider the distinction between romantics and classicists made by Robert M. Pirsig in *Zen and the Art* *of Motorcycle Maintenance*. That reading finds the romantic point of view in seeing the "immediate appearance" of things and the classicist's in seeing the "underlying form itself." Rather than perceiving technical writing as "dull, complex lists of names, lines and numbers," instructors can begin to see (along with their first- and second-year college students) "within the lines and shapes and symbols . . . a tremendous richness of underlying form."[4] Like new Adams, they see things as though for the first time.

As a result of this changed perspective, new teachers of business and technical writing become less provincial. Perhaps in the past they, like many humanists, had limited understanding and appreciation of technology. The word *technical*, perhaps formerly a pejorative term, suddenly accumulates positive connotations. And a similar transformation takes place in their thinking about writing in technical fields. Just as they think they are beginning to understand technical writing, they find that their awareness needs to be expanded. Here, again, an experienced teacher provides help. John A. Walter's definition of the scope of technical writing ("any discipline and the writing about it that has as its purpose the conveying of factual information for a specific purpose")[5] leads again to friends and colleagues in disciplines other than English. Conversations with a potter may send teachers to books on ceramics, and conversations with an art historian may lead to the technical writing involved in describing a new method used to date paintings. And English teachers may even note the technical nature of literary criticism as they begin to see its language from an outsider's point of view.

Thus, new teachers of business and technical writing come to see the world differently. From the restrictions of one field, they are freed to pursue new areas of learning. Or perhaps they are merely enabled to develop further a latent respect for technology—a respect not previously acknowledged. After discovering the scope and nature of technical writing, they more fully appreciate the liberation given by the machine. They can examine the machine itself rather than the theme of the machine in literature. In the process of preparing professionally—reading books and journals, gathering samples of business and technical writing, talking with technicians and business people—they have become psychologically prepared. With altered perspectives and fresh insight, new teachers of business and technical writing find themselves ready to read papers on the removal of hydrocarbons from automobile engines, on blown-in insulation, and on holding pens for cattle. They are quite at home in business and technical writing.

Notes

1. Paper presented at the meeting of the Mississippi Valley Section of the Society of Automotive Engineers, Waterloo, Iowa, 27 January 1977.

2. Walter James Miller, "What Can the Technical Writer of the Past Teach the Technical Writer of Today?" *IRE Transactions on Engineering Writing and Speech*, EWS-4 (December 1961): 69-76 (Reprinted in Cunningham and Estrin, *The Teaching of Technical Writing*, 198-216); Roger E. Masse and Patrick M. Kelley, "Teaching the Tradition of Technical and Scientific Writing," in Sawyer, *Technical and Professional Communication*, 79-87 (First presented as a paper at the Conference on College Composition and Communication, Philadelphia, Pennsylvania, 23 March 1976).

3. *Teaching Technical Writing: Methods for College English Teachers*, 2-3.

4. Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance* (New York: William Morrow, 1974), 73.

5. "Technical Writing: Species or Genus?" *Journal of Technical Writing and Communication* 7, no. 3 (1977): 246.

3 Distinguishing Characteristics of the Technical Writing Course

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English instructors planning to teach technical writing courses for two-year degree programs must identify the content and skills to be included. Despite similarities in the content of all writing classes, special topics need to be included in technical writing courses: (1) writing to a particular audience for a specific purpose, (2) using clear, concise, and objective language, (3) mastering business letter and report formats, and (4) using graphics appropriately. Although English instructors sometimes hesitate to teach technical writing courses because they have reservations about their ability to evaluate technical papers, that evaluation, they will discover, is based in large part on student mastery of these special topics.

What content and skills should be considered in planning a technical writing course for an associate degree program in one of the professions? Most definitions of technical writing stress the need for clarity, conciseness, and objectivity; generally, the writing is described as functional, that is, it conveys information to be used by the reader. Certainly these are attributes of good technical writing, but another quality, equally important, is how to present information persuasively, effectively. Letters, proposals, reports are not merely information transmitters; rather, they are persuasive messages that require the perceptive and sensitive use of language. Students who enter technical writing classes, however, often have not acquired genuine facility with language. Thus, technical writing courses in two-year programs must include practice in using concrete words, developing paragraphs, and organizing ideas logically—language skills shared by all writers, including technical writers. As in any composition course, attention to grammar and mechanics is necessary.

Despite the fact that there are more similarities than differences between technical writing and other types of writing, certain topics are specific to technical writing courses. At the College of Applied Science we offer a technical writing course as a second-quarter option in a composition sequence of three quarters. Its goals include (1) writing for different audiences, (2) using clear, concise language, (3) mastering business letter and report formats, and (4) using graphic aids appropriately. Not only are these goals specific to our technical writing course, but certain evaluation techniques are also uniquely appropriate.

Audience

Writing with a specific audience in mind is not a part of the writing backgrounds of many students. They have written papers, stories, themes, but seldom have these been intended for a specific or limited audience as their on-the-job writing will most certainly be. Consequently, one challenge for the instructor is to devise situations in which the student-writer communicates with a particular audience. Writing resumes and letters of application is one such exercise. Our students write these in response to advertisements furnished by our Placement Service or obtained from local newspapers. Analyzing the information requested by the ad is the first step in the assignment; formulating a letter that responds to those requests is the second. One instructor asks students who are looking for co-op jobs to mail the letters. Employer reaction has been very positive; in fact, one company that no longer hired our co-op students began rehiring because of the letter one student developed for this assignment.

While students are working on these letters, I use examples from them to teach tone and style. Typically, one finds at least one draft that begins every sentence with "I," one that uses only generalities ("I have always been interested in electronics"), and one that begins "While glancing through the paper, I happened to see your ad."

In a second assignment designed to give practice in writing for a specific audience, students select technical terms used in their major fields. As a prewriting activity we develop analogies to explain the terms to someone who is unfamiliar with them (sometimes that is me). Finally, each student chooses one term and defines it for two widely different audiences. This assignment is based on one suggested by Nell Ann Pickett and Ann A. Laster. The audience options they offer range from fifth-graders who found the term in the *Weekly Reader* to the reader of an examination in the student's technical field.[1]

Language

Learning to use clear, concise language begins with our first assignment, the letter, and continues through the last draft of the final report. Of course the problems that did not go away despite four years of high school English and College Composition I (pronoun reference, dangling modifiers, subject-verb agreement) crop up in the technical writing course and must be dealt with, but an even more difficult task is to help students recognize effective, objective writing. One assignment I find useful asks students to analyze a piece of their own writing, a description of a mechanism for example, by answering these questions.

1. What is the average sentence length? Compare this figure to the professional writer's average of twenty-one words.
2. What is the average paragraph length? Compare this figure to the paragraph length of about one hundred words found in publications such as *Scientific American.*
3. What percent of the sentences begin with the subject? What percent begin in some other way?
4. Where is the action in the sentences? Is it found in the verbs?
5. Does the active or passive voice predominate?

And when writing is at the draft stage, I ask students to underline every *the, this,* or *it* that opens a sentence. We then work together to revise these sentences to incorporate stronger beginnings.

To promote productive revisions of the language used in the final report, I divide the class into small groups of six or seven students, meet with them, and have them read and react to each paper. Students note confusing sentences and incomplete ideas and offer suggestions for revision. At these sessions, I stress that revising and proofreading are different processes.

Although third person, passive voice seems well rooted in technical writing, objective writing depends on more than choice of pronoun or voice. Learning to distinguish fact from inference and to recognize the impact of connotative language is more important—and more difficult—than learning to write in third person. One technique that helps students distinguish between fact and inference is to assign a news article that contains both. Discuss which statements are fact and which are inference. The writer's choice of words and their influence on the reader can then be examined.

Reports and Format

All technical writing texts provide formats for reports and letters, but since these formats vary from company to company, the most important skill to stress in teaching the formal report is organization. Layout and sectioning devices that enhance the report's readability will also prove useful to students.

For the report project, our students select a topic of interest to them, often based on their major, and write a brief statement explaining why they have selected that topic. After a discussion with each student, I ask the student to describe the purpose of the report and the audience for whom it is intended. This statement helps the student to discover a focus for the paper and to see that simply accumulating and recording facts does not constitute a report. For example, one student who worked for a company installing home alarm systems decided to write a report on home alarms. After completing the statement described above, he realized that if the report were for his supervisor it would have a different content, emphasis, and tone than it would have if it were for a customer considering installing such a system.

Reports for this assignment may be drawn entirely from library sources or from job-related experience, but I require students to use library sources in all reports because many students are unfamiliar with the specialized handbooks and trade journals in their fields. As part of their research, they write a summary of one article they plan to use as a source in their formal report. Students turn in this summary with a photocopy of the article.

Throughout the steps of organizing, pruning, revising, designing layout, and proofreading, we hold regular conferences, small group and individual. Before the final report is submitted, each student presents an oral summary of the report to the class. This oral presentation has several benefits. First, questions from the class often point to areas of the written report that are unclear or undeveloped. Second, the oral summary helps to reduce plagiarism. Students hesitate to stand before a group of fellow students ill-prepared to explain terms, discuss ramifications, or defend the validity of information. Finally, oral presentations are almost certain to be required in future work situations.

To familiarize students with the abbreviations, numbering systems, and symbols common to technical writing, I assign the text material dealing with practices and present a lecture that highlights standard practice.

Graphics

Most technical reports rely on some form of graphic presentation; yet graphic communication is probably the area most neglected by writing instructors. Drawings, photographs, charts, graphs, and tables and the principles of titling and labeling are reviewed in most technical writing texts, but knowing when and how to use them requires instruction and practice. To illustrate the value of presenting statistical information in graphic rather than paragraph form, I have students convert a paragraph of statistics into a graph or table. We discuss audience and purpose as factors in the decision about what type of graph to use. Several presentations of the same information are put on the overhead projector or chalkboard and students readily see how a given presentation affects emphasis, even how it affects the perception of relationships between areas of information.

Teaching students to integrate visuals within a report is another important task. Students frequently consider graphics window dressing and neglect to demonstrate their relevance or to refer to them in written text.

Early in the course, I have students describe a simple mechanism. For this assignment I bring an assortment of tools to class, and each student selects one of special interest. Then, based on notes and sketches made in class, the student writes a description of the tool. A plan sheet is provided as a guide to notetaking, and the final description employs a drawing as the focal point of the writing. Again, this exercise has multiple purposes—but it requires accurate observation, careful notetaking, and the integration of graphics with text.

Evaluation

English instructors about to teach technical writing courses often have reservations about grading technical papers. In my own experience, I have found few students in two-year programs who are sophisticated enough in subject matter to write beyond the comprehension of the writing instructor, but the instructor who finds students writing highly technical material has options. One is to ask students to write at least some of the shorter assignments for lay audiences as well as for specialized ones. This request is not merely for the convenience of the teacher since technicians do need to write for a range of readers, including novices in the field and experts in other fields.

An effective way of ensuring technical accuracy is to group five or six students enrolled in the same major and have them read and critique each other's papers. Usually, they will challenge inaccurate information and spot unclear and inadequate explanations. Still another solution is to arrange for each student to have a technical reader, an instructor in the student's major who checks papers for technical accuracy.

Conclusion

Technical writing courses are interesting and challenging to teach, and student response is generally positive. In fact, I am persuaded that this approach to writing is so effective that students in general education programs as well as students majoring in technical fields benefit from it. With advance planning directed toward the special writing needs of professionals and with reliance on innovative evaluation techniques, English instructors can approach the teaching of technical writing with confidence and enthusiasm.

Notes

1. *Technical English: Writing, Reading, and Speaking,* 2d ed. (San Francisco: Canfield Press, 1975), 88.

4 Understanding the Rhetoric of Scientific Writing

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Teachers of technical writing are usually trained in English composition and literature and have normally taken few courses in science, engineering, or mathematics. It may be of some help to them to understand (1) that the function of all sciences is to predict, but that philosophers of science rank the various sciences in a hierarchical order of predictive ability, (2) that the esoteric terminology of each science may be clarified by asking for operational definitions of terms and concepts, and (3) that the experimental tests of prediction follow a common, simple, logical plan which is illustrated in this paper in outline form. Finally (4), the mathematical proofs of experimental results can be made clear if the aim, rather than the method, of the mathematics is discussed.

Teachers of technical writing are usually drawn from the ranks of people trained in English composition and literature, and most of them have had only a limited number of courses in the sciences and in the practical applications of those sciences which constitute engineering and technology. For this reason they may have difficulty at first in dealing with reports in which the subject matter is drawn from those fields. It is to those teachers that this essay is addressed.

On the cover of *Scientific American* for October 1977 you will see what appears to be an aerial photograph of the city of Flagstaff, Arizona. However, it is not an aerial photograph. It is a side-looking radar image taken from an airplane flying at 40,000 feet, 25 miles east of Flagstaff. The radar pulses sent from the plane reflected from the surface of the ground and were received in the plane. There they were displayed on a cathode-ray tube and recorded on photographic film making a radar hologram.

In 1971 Dr. Dennis Gabor won the Nobel Prize for developing the theory of holography, even though he produced no holograms himself. The practical development of holography was done by Professor Emmett Leith of our Electrical and Computer Engineering Department. He created the side-looking radar hologram technique in 1960 while working at the Radar Laboratories and everyone was delighted with the results. However, they could not understand *how* he managed to produce these interesting pictures and Emmett couldn't figure out how to explain it to them. So I was hired to see if I could write up an explanation that people could understand. I eventually succeeded, but I will let you read the article in that October 1977 *Scientific American* if you would like to understand the process.[1]

The problem in science writing is to explain how effects similar to this are created. Since many of you will be dealing with students from a variety of scientific fields, not merely electrical engineering, let me start off with some of the things that all fields of science have in common.

The Function of the Sciences: To Predict

James B. Conant, former president of Harvard University and a renowned chemist, points out in *Modern Science and Modern Man* that the function of science is to predict—to predict what will happen under certain prescribed circumstances.[2] That is the general aim of *all* sciences, but some sciences are better at predicting than others. So there is no single Science, with a capital letter. There are *the* sciences—plural.

The Hierarchy of the Sciences

The differences among the various sciences have been of great interest to philosophers. And most philosophers seem to agree that the various sciences can be arranged in a hierarchy depending upon their ability to predict, and they seem to agree on the order of this hierarchy. Physics is always considered the most developed science, the one best able to predict. Dr. Gabor's prediction that holography *could* be developed, even though he had not been able to construct a hologram, may serve to illustrate. Albert Einstein's prediction that energy is equal to mass multiplied by the square of the velocity of light may serve as another illustration.

Chemistry is usually considered the second science. It is not quite so able to predict as physics, although it is rapidly approaching physics in this ability. Biology follows chemistry. There are a good many things that biology cannot predict, or can predict only within some statistical probability. For example, people who are overweight, who eat lots of carbohydrates, and who smoke are generally more subject to heart attacks than are most other people. But this rule does not seem to apply to a group of families of Italian extraction living near Philadelphia. Most of them are fat, eat lots of pasta, and smoke, but seem to be immune to heart attacks. Something about the Italian family life style seems to be beneficial, but what it is, no one seems to know.

Psychology follows biology and has even more trouble predicting. For example, can you make a color picture from black and white film? Yes, you can, as Dr. Edwin Land of Polaroid Camera fame found out by accident. Make two black and white slides of the same color scene, one with a red filter over the camera lens, the other with a green filter over the lens. Project both slides at the same time so that they overlap on the screen, use the red filter on the projector with the slide shot through the red filter, but use nothing on the projector with the slide shot through the green filter. There you are—a color picture on the screen! Why do you see a color picture? No one really knows, but you can see one of Dr. Land's color pictures on the cover of *Scientific American.*[3]

All sorts of reasons have been advanced for these differences among the sciences. Simplicity is one. Physics is simpler than chemistry because it omits chemical reactions. Chemistry is simpler than biology because it omits living organisms. Biology is simpler than psychology because it omits thinking organisms. And so forth.

Or ego involvement is another explanation. No one feels much sympathy for an atom, so it is all right to smash one. It won't scream for help. But people are awfully fond of puppy dogs and it makes most of them feel queasy to learn that surgeons sometimes practice their surgical techniques on dogs before trying them out on people.

But Anatol Rapoport argues that the hierarchy of the sciences is largely a matter of semantics; that is, the ability to define precisely what we are talking about.[4] Physics is the best developed science because it starts with sharply defined, quantitative—that is, measurable, rather than intuitive—variables or phenomena. It may well be easier to find unchanging phenomena in physics than in biology. After all, living things grow, and thus change with time, while many physical phenomena stay the same and are thus easier to specify precisely. And you often can't take a living organism apart to see what makes it work without killing it, thus destroying the very thing you are trying to find out.

Clarifying Scientific Terminology

When you first start teaching technical writing, I suspect that one of the things that will bother you most is the jargon that scientists and engineers use. Sanitary engineers talk about "B.O.D.," mechanical engineers talk about "Reynolds number," biologists talk about "myocardial perfusion," psychologists talk about "critical flicker fusion."

It sounds scary at first, but there is a very simple way of getting specialists to make their terms clear to almost anyone. The trick is to force them to define these terms *operationally*. This is, to my mind, one of the important rhetorical devices of science writing. The thing to remember is that scientists know by measuring; or, as the philosopher Hannah Arendt put it, scientists know through process. To understand what scientists mean by a term, ask them how they measure it.

Take "B.O.D." for example. Sanitary engineers may tell you that it is a measure of the amount of pollution in a body of water and that "B.O.D." stands for biochemical oxygen demand. The term probably still means very little to most people. But now watch how they measure it. They take several samples of water they think may be polluted, measure the amount of oxygen dissolved in one sample by adding chemical reagents to it, add some coliform bacteria (the bacteria that live in our intestines) to the other samples, seal these sample bottles, and wait. At the end of several days they uncap these sample bottles and measure the amount of oxygen still dissolved in them. The smaller the amount of oxygen, the more the coliform bacteria have used up because they had plenty of pollution to eat in those water samples.

Operational definitions are discussed in a very interesting book that I would heartily recommend to teachers of technical writing if they could only find it in print. It is *The Logic of Modern Physics* by the Nobel Prize winner, Percy W. Bridgman. It was originally published by Macmillan in 1927 and reissued in paperback in 1961.

But now, having defined the terms, or the phenomena, the scientist seeks to predict relationships between them. "Reynolds number," for example, is a dimensionless number—which simply means a ratio, like pi—which is the result of combining the viscosity, or thickness, of an incompressible fluid, like oil or water, with the velocity of its flow and the length of the pipe in which it flows. For some curious reason if the Reynolds number is below 1000, the flow is smooth, or laminar. Beyond that number it starts to become turbulent, until at 100,000 it is definitely turbulent. This is very important for aerospace engineers and mechanical engineers to know. Mechanical engineers want turbulent flow in the cylinders of your automobile engine so that the gasoline and air will mix thoroughly. Aerospace engineers are usually trying to avoid turbulent flow because it creates drag and slows down the aircraft.

It is through experiment that scientists establish these relationships, and it is important for the teacher of technical writing to have an idea of the rhetorical logic behind an experiment. It is interesting to note that the overall plan of an experiment is the same in every science.

What is this plan?

The Plan of Experiment

One naturally begins with a sequence of puzzling events which one would like to explain to oneself—explain in the sense of being able to predict *when*, and *under what conditions*, these events will occur in this sequence. If one can do this, one may be able to modify, or control, the conditions and thus make the events occur or not occur as one wishes.

The Situation

For example, the German entomologist Karl Von Frisch was much interested in the behavior of honey bees.[5] He noticed that when he placed a pan of sugar water at some distance from a hive of honey bees, a single bee, a scout, would eventually find the sugar water, sample it, and fly off in the direction of the hive. Shortly thereafter a crowd of honey bees would appear at the sugar water pan. It appeared to Von Frisch that the scout bee had in some way told the other bees where the sugar water was located. But how?

The next step in the experimental plan is to isolate features of this sequence of events that seem to be related in some way.

Von Frisch did this by cutting a hole in the front of the hive in order to see what the scout bee *did* when it returned to the hive. The first scout bee, clearly identified by blue chalk dust sprayed on it when it settled on the sugar water pan, climbed up the vertical wall of the honeycomb frame, and there performed a sort of dance in the form of a figure eight.

The Hypothesis

Now comes the crucial step in the experimental plan—an act of pure imagination. The experimenter makes an inspired guess about the relationship between two—only two, if possible—events in this puzzling sequence. This is called the *hypothesis*, and the mark of a really good scientist is the ability to create simple, clear, and testable hypotheses.

Von Frisch's guess, or hypothesis, was that the bee's figure eight dance—remember that this is on the vertical wall of the honeycomb—was related to the direction—on the horizontal plane—of the pan of sugar water from the hive.

The Test of the Hypothesis

Now some way must be found to test this guess in order to find out if it is a good one or a bad one. If the hypothesis cannot be tested, it is essentially useless.

Independent Variable

The first step in the test is to figure out which of the two events, which you guess are related, can be changed or modified. This is called the independent variable.

Since it would be difficult, if not impossible, to reach into the hive to change the figure eight dance of the bee, Von Frisch naturally chose to change the direction of the pan of sugar water in relation to the hive.

But you need to go further than this. You need to devise some *measure* of the change you plan to make in the independent variable. That was simple for Von Frisch. Compass directions would do; the pan of sugar water could be North, or zero degrees; East, or 90 degrees; South, or 180 degrees; or West, or 270 degrees from the hive.

Dependent Variable

Next you must choose which aspect of the related event to observe and record. This is called the dependent variable because you expect it to change depending upon how you change the related independent variable. As you can guess, Von Frisch chose to observe the direction the bee took in crossing the figure eight. And the dependent variable must be measured also. That was simple in this case: straight up, or zero degrees; to the right, 90 degrees; straight down, 180 degrees; and to the left, 270 degrees.

Controlled Variables

But hold on a minute! There are all sorts of other things that might cause the bee to change its dance: the amount of sugar water in the pan, the distance of the pan from the hive, and so forth. You don't want these to influence the bee's dance and change the results you expect. So you do your best to cancel out these other possible causative variables. In this case you can always keep the pan full and always keep it the same distance from the hive no matter what its direction. But no matter how hard you work at this, you will probably find that you have overlooked something. Von Frisch did.

Prediction

Finally, what do you expect to happen if your guess, or hypothesis, is correct? Naturally you hope that as you move the sugar water by 90 degrees, the bee's dance will rotate by 90 degrees, and if you plot the measure of the independent variable on the horizontal axis of Cartesian coordinates—an ordinary graph—and the measure of the dependent variable on the vertical axis, you will get a nice, neat straight line—a linear relationship.

Results and Conclusions

Now you run your test and plot your results. Von Frisch simply moved the sugar water pan by degrees and recorded the degrees of the bee's dance. Sure enough, the bee's dance changed as he had predicted. But not in a nice, neat linear way. Some other overlooked causative variable was also influencing the bee's dance.

I am not going to tell you what it was because I think you should read Von Frisch's account for yourself. It is just as exciting as a good detective story, and by the end of his short little book Von Frisch can make that scout bee tell a lie to the other bees and send them off in the wrong direction.

Student Application

This same sequence of steps is followed, in general, in experiments in most of the sciences. To make this experimental plan easier to visualize, I show it in outline form below.

Plan of an Experimental Investigation

I. Analysis of the problem
    A. Description of the situation
    B. Observed events to be accounted for or explained
    C. Hypothesis or probable explanation of observed events (This is the most important part of the whole report and must be very carefully explained.)
II. Feasible tests of hypothesis
    A. Procedure for test one
        1. Method of measuring observed event (dependent variable)
        2. Method of measuring probable cause (independent variable)

      3. Methods for controlling or cancelling out other possible causes
      4. Steps in manipulating probable cause (independent variable)
      5. Method of analyzing results
      6. Results expected if hypothesis is correct
   B. Procedure for test two
III. Tests actually performed and results
   A. Test one
      1. Actual procedure
      2. Actual results
   B. Test two
IV. Conclusions

It is relatively easy to see how Von Frisch's study fits this experimental plan. To make it easier to envision the kinds of applications you might expect from students in technical fields, I give an example below.

Experimental Plan: Tool Life and Side-Rake Angle

1. Situation

   Metal cutting operations are costly. In turning operations on a lathe the grinding of tool bits to the proper angles has normally been left up to the individual machinist who chose the angles based upon experience rather than upon experimentally determined evidence. For this reason the life of tool bits used in the same operation has varied markedly from machinist to machinist.

   This test will be performed to determine the optimum number of degrees for just one angle—the side-rake angle—on a tool bit used in a metal cutting lathe.

   Hypothesis: The life of a tool bit changes with the side-rake of the tool bit, other things being equal.
2. Test of Hypothesis
   a. Dependent variable: tool life.
      Tool life may be measured as the number of minutes after the start of the turning operation when any of the following occur: (1) the tool bit starts to glow red hot, (2) the surface finish of the metal being cut starts to deteriorate, (3) a grating or chirping noise occurs, or (4) the tool bit stops cutting.
   b. Independent variable: side-rake angle.
      Side-rake angles will be ground to 0°, 20°, 30°, and 45° as measured on the tool grinding wheel.
   c. Other possible causative variables to be kept constant.
      1) 340 stainless steel work material will be used for all tests.
      2) M-2 high-speed steel tool bits will be used for all tests.
      3) All tool bits will have 0° back-rake angle.
      4) All tool bits will have 6° end-relief angle.
      5) All tool bits will have 7° side-relief angle.

6) All tool bits will have 6° end cutting-edge angle.
7) All tool bits will have 0° side cutting-edge angle.
8) All tool bits will have 0.0 inch nose radius.
9) The depth of cut on all tests will be 0.050 inches.

d. Test procedure.
Eighteen (18) tests will be performed for each tool bit side-rake angle. Three different feed-rates and six different rotational velocities will be used as follows:

Feed-rate in inches per revolution	Rotational velocity in feet per minute					
0.002	140	150	160	170	180	200
0.006	140	150	160	170	180	200
0.012	140	150	160	170	180	200

Minutes of tool life for each side-rake angle will be recorded during each test.

e. Method of analyzing results.
For each side-rake angle and feed-rate, the minutes of tool life versus the rotational velocity will be plotted on logarithmic graph paper.

f. Results expected if hypothesis in question is answered yes.
It is expected that the data points will fall on a straight line. The slope of this line should enable one to predict tool life, given the side-rake angle, the feed-rate, and the rotational velocity.

Clarifying Mathematics

But now the results you obtain on your test must be persuasively presented. Can you demonstrate that your results are not accidental, not merely the result of chance? The most persuasive argument you can use here is naturally mathematical because chance and probability are mathematical concepts. That is one of the reasons that scientific manuscripts seem to be full of mathematical and statistical formulas; they are normally arguing against the *null hypothesis,* the hypothesis that sheer chance or accident could produce the same results that you believe you have created by carefully manipulating your independent variable and measuring the dependent variable.

Such mathematical proofs are not so difficult to understand if you can persuade the scientist to show you *what* it is he or she is trying to prove, rather than showing you *how* he or she is trying to prove it mathematically. Remember, the scientist is trying to prove that there is some sort of relationship between observable and measurable physical phenomena. The mathematical symbols used are simply substitutes, a form of shorthand, for ordinary English words. For example, the mathematical formula for a coefficient of correlation is

$$r^2_{xy} = \frac{[N \Sigma XY - (\Sigma X)(\Sigma Y)]^2}{[N \Sigma X^2 - (\Sigma X)^2][N \Sigma Y^2 - (\Sigma Y)^2]}$$

What does all this mean? If I explain that N represents the total number of individuals tested, that X is the symbol for a series of individuals' scores on one test, and that Y is the symbol for the same individuals' scores on a second test, you probably could compute a coefficient of correlation. But still, what does it all mean?

The number you get after finding the square root of r^2 simply tells you how close the data points you plotted on your Cartesian coordinates, your graph, are to a straight line. If N was the number of observations you made of those bees, and X represented the position in degrees of the sugar water from the hive for each observation, while Y represented the position in degrees of the bee's dance for the same observation, and the square root of r^2 turned out to be 1.00, you would find the data points all fell on a straight line and you had a perfect correlation. Likewise, if r^2 turned out to be 0.00, you would find the data points scattered all over the graph, indicating no correlation, or connection, between the location of the sugar water and the direction of the bee's dance.

Once you can get the scientist to explain to you what physical, measurable phenomenon each symbol in a formula stands for and what the whole formula demonstrates, the mystery of the mathematics starts to evaporate and everything becomes clearer.

However, you may find that some students are taught almost entirely in mathematical language—this is especially true of electrical engineers—and accept the validity of a formula without understanding what operations led to the creation of the formula. A student may tell you, for example, that Ohm's Law is $E = I \times R$, but the student may not know that George Simon Ohm discovered this relationship between electromotive force, E, or voltage, and I, or amperes, and R, or resistance, by simply draping different lengths of wire connected to the terminals of a battery over an ordinary magnetic compass. Ohm discovered that the shorter the wire—thus the smaller the resistance—or the larger the battery—thus the larger the voltage—the more the compass needle was deflected in degrees from North.

So I return to the importance of operational definitions in the rhetoric of scientific writing. Get the scientist, no matter what the field, to tell you, or even better, show you, what he or she *does* when defining phenomena and establishing their relationships and I believe that most scientific writing can be made not only clear but interesting.

Notes

1. Homer Jensen et al., "Side-Looking Airborne Radar," *Scientific American* 237 (October 1977): 85–95.

2. James B. Conant, *Modern Science and Modern Man* (New York: Columbia University Press, 1952).

3. Edwin H. Land, "Experiments in Color Vision," *Scientific American* 200 (May 1959): 84–99.

4. Anatol Rapoport, "Various Meanings of Theory," *American Political Science Review* 52 (December 1958): 972–88.

5. Karl Von Frisch, *Bees: Their Vision, Chemical Senses, and Language* (Ithaca, N.Y.: Cornell University Press, 1950).

Part Two: Developing the Basic Course

5 You, Too, Can Teach a Relevant Course in Technical Writing

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Teachers can create relevant and rewarding courses in technical writing by designing assignments so that each student writes on subjects pertaining to his or her technical field or professional interest. The first unit concentrates on career documents and professional motivation. The second familiarizes students with the information resources in their fields. Other units give practice in producing letters, memos, and reports on subjects typical of their fields. Final papers are technical articles suitable for professional journals.

Students come to a course in business or technical writing with the hope that they will write on subjects related to their major fields of interest. Writing teachers, however, are not experts in the various technical fields of their students, and they often take a "lowest common denominator approach" in which all students complete the same assignments, assignments designed to give them general practice in technical exposition. Although this approach may work, it is highly inefficient because students spend so much time analyzing unfamiliar problem content that will be of no permanent use. More important, this approach fails to tap the interest students have in the writing styles and strategies peculiar to their chosen fields.

Experience shows, however, that teachers who are not technical experts can teach courses that are relevant to the needs of career-oriented students. This paper suggests how that may be accomplished, even when students from a number of disciplines are in the same class.

Introducing the Course

Often the instructor's initial problem is student motivation. Students will not learn to write better unless they want to do so, and many have been discouraged by past experiences. It is important, therefore, to introduce the course with candor and a bit of psychology.

You might begin by exploring their attitudes toward writing, opening with the question "How many of you like to write?" Usually only two or three students tentatively raise their hands. Then ask students to express what they don't like about writing; try to bring out their bad experiences and negative attitudes. Many of their comments center on courses that were filled with exercises in which their main problem was not execution but the need to be creative in making up an interesting subject to write about. They also complain about teachers who criticize their work without offering constructive comments, and they are especially sensitive to contradictory comments made by the same teacher or by different teachers.

All of these comments and complaints can be turned into an asset by explaining that this is a course with a difference, and that difference is the fact that students will write about their own professional fields in every assignment. They will be given the opportunity—and the challenge—to write about subjects they know and care about. They won't be "snowing" the teacher—they will be writing to a real audience about real problems. Instead of making up a topic, they will choose from meaningful topics that will help them build their professional careers and might actually help them get a job.

One of the best ways to convince students of their need for a professional writing course is to administer shock treatment at the first class meeting. Begin by defining technical writing, pointing out its importance as a professional tool; then encourage the class to define what professionalism is. Since one attribute of professionals is mastery of the facts of their professional environment, administer an awareness exercise in which students transcribe fifteen numbered sentences exactly as dictated to them, filling in blanks where indicated. No abbreviations are allowed. I use sentences similar to these:

> Today's date is (insert date in proper form).
>
> I am attending (complete name of institution).
>
> I am working for the degree of (official name of degree).
>
> I am in the Department of (official name of department).
>
> My Department Head is (name in full).
>
> Pennsylvania's United States Senators are (names in full).

The results of this exercise are always appalling; not only is student awareness being tested, but also the ability to write complete sentences and to spell. Some students can't follow simple instructions. Many can't spell the name of the degree toward which they are working or the name of their discipline, even though graduation may be only months away. Others have trouble spelling "buisness," "personel," "engenerring," "enviornmetal," and "Pennslyvannia." Many students abbreviate profusely to cover up spelling problems, and others use all caps to eliminate the problem of capitalization. Some try to conceal ignorance with humor, and outrageous answers appear. The worst papers and the funny ones, with names deleted, may be used for overhead projection. With proper staging, viewing these can lead to an uproarious class session in which the types and frequency of errors help students realize that what has happened really isn't funny. If they are going to be professionals, they'll have to do better.

Three Ongoing Assignments

Early in the course the students may be given three ongoing assignments that give beginning professionals an appreciation of the elements that make up a professional career: mastery of facts and resources, correctness, professional relationships, synthesis, and creativity. You will have no control over whether students follow through on these assignments, but you may express hope that they will begin them during this course and continue them throughout their professional careers.

The first assignment is an *Errors List* on which students record the errors they make in grammar or spelling, along with correct solutions. They are told to review this list frequently and to use it as a checklist after completing an assignment. This course may represent the last chance they will ever have to learn of their mistakes and how to correct them, so they should establish an organized method of doing so.

The second is an *Authorities List* on which students write the names, addresses, telephone numbers, and specialties of authorities in their fields as they come across them. This is the beginning of a professional communications network that will enable them to obtain answers and build relationships with professionals in their fields.

The third is an *Idea and Clipping File* in which students put all items and ideas of future professional interest, no matter how half-baked or speculative they seem. Many professionals have found this file to be an excellent compost heap of information that works up through the years. Like compost, it should be turned over at least every six months to produce best results. The file should not be overorganized because keeping it then becomes *work and not fun.* It's surprising what useful ideas emerge from this collection over the years.

Unit One: Career Documents

Having piqued the professional interests of students and having given them some reason for hope in a relevant course, the instructor should next convince them of the practicality of the course with the introduction of the first formal unit—the preparation of resumes and letters of application. What better way to introduce the subject of technical writing than to teach students how to present their own professional profiles for a real purpose to a real audience? Not only is the assignment psychologically appropriate, but it also involves the main attributes that define technical writing: audience, purpose, facts, and strategies.

You can make this unit even more meaningful if you consult the career and placement officials at your school about job opportunities for your students. Excellent books on the subject of career and job finding are available, such as Richard N. Bolles's *What Color Is Your Parachute?* (Berkeley, Calif.: Ten Speed Press, 1981). One of the main values of bringing in a book like Bolles's is that it emphasizes the need for job-seekers to develop and apply communications strategies—and that leads directly to one of my main teaching principles: *technical writing is 75 percent systems work, so you'd better analyze the situation thoroughly before beginning to write.*

While you are lecturing on the subject of writing strategies for job-seekers, give two initial writing assignments: Career Objectives (one page) and Career Opportunities for a ____________ Major (two pages). The first assignment should be discussed, rewritten, and refined until it becomes second nature to the student, who can then insert it into a resume, interview, or conversation neatly and professionally. The second informs students about opportunities and employers in their fields, job-information resources, what jobs to apply for, and to whom and how to apply.

A study of the job-finding process suggests that under some circumstances the letter of application is a more persuasive document than the resume; therefore, the assignment that follows the resume should be the letter. It is essential that this assignment be given at this time, rather than in a later unit on letters, because its uses and strategies must be discussed in conjunction with the resume. It is especially helpful to students about to graduate, and it may help those who have more time obtain semiprofessional summer and part-time employment.

Unit Two: Information Resources

The second unit closes a gap that seems to exist in most academic curricula. Students need to be familiar with the technical literature in their fields before they can learn to write professionally; yet many students rarely visit the college or university library and have no idea what resources are available.

With the help of a librarian, you can conduct a session in which an outline of library resources is handed out and discussed. Students are told what various references contain, how they are used, and their relationships to other reference sources. They are then given the midterm assignment, a formal report on Information Resources Available to a __________ Major. In this report students compile an annotated bibliography modeled on a handout, which they adapt to their own use by deleting, adding, and commenting. This report is addressed to themselves ten years hence and organized as a formal report with cover, title page, abstract, contents, introduction, summary, discussion, conclusions, and appendix. In the conclusions section students explain how to find information in their fields in the future by pointing out the best resources and establishing information paths or flow diagrams.

Although initially overwhelmed by this assignment, most students quickly appreciate its usefulness. Many students catch on professionally for the first time during this assignment. Some come to class bleary-eyed on Monday morning saying, "I spent all weekend in the library just going from one great source to another. I never knew all this good stuff existed."

This assignment gives you the opportunity to teach the formats and strategies of formal reports, how to approach a research project, and how to use a specific bibliographic style. Caution students not to include textbooks in their bibliographies because they are soon obsolete. Instead, encourage students to concentrate on renewing resources such as guides to the literature, bibliographies, abstracting services, indexes, handbooks, and special information resources such as interlibrary loan, computer retrieval services, and other specialized services peculiar to their fields. Have them cover journal indexes thoroughly, but not individual journals and journal articles, reserving these subjects for later assignments.

Unit Three: Development of Letters, Memos, and Reports

Instead of teaching specific forms of documents from a textbook, encourage students to teach themselves by bringing in samples of technical writing from their fields and analyzing them for the class. In this way students acquire the analytical skills necessary to develop their own communications; as examples from various fields are presented, basic principles and conventions emerge. Individual letter and memo assignments can then be given to students according to their various fields. Forms of documentation such as operating instructions, manuals, proposals, and specifications should be mentioned only briefly because they are highly specialized, heavily formatted, and totally dependent on the customers' needs.

A useful memorandum assignment is to ask the students to assume that a future boss has asked for a memorandum recommending several technical or trade journals to which the department should subscribe. This exercise gives the student experience with memo format, an opportunity to evaluate journals in his or her field, and the task of responding to a specific request—summarizing, providing documentation, and offering justification—that is, providing the boss with solutions rather than problems.

Unit Four: Use of Illustrations

Most teachers do not sufficiently stress the importance of intelligently conceived and well-designed illustrations, including photographs, drawings, graphs, and tabular material. A show-and-tell strategy works well here: each student locates the main types of illustrations used in the media of his or her field and explains how they are adapted to problems peculiar to that field. Beyond this, the teacher can comment on such general topics as design, framing, cropping, composition, and various types of photographic and printing processes. If the teacher collects examples of the various types of illustrated reports that professionals prepare and receive, these can be run into class sessions as needed, shown briefly or discussed at length.

It is helpful, and a welcome break from routine, to set up a class visit to a printing company or newspaper graphics department to observe various graphic and printing techniques in process. Since most professionals in the various technical fields depend upon graphics experts, it is essential that students know what experts can do for them and how to establish the relationships and procedures that enable experts to do the best job possible.

Unit Five: The Technical Article

By the time students get to the final assignment of the course, they have had experience with the research tools and literature resources of their fields and have come across many thought-provoking articles and subjects of interest. The final assignment, then, is for the student to become part of the literature by writing a technical article for a professional journal or trade magazine. The student researches a particular subject, finds at least three independent sources of information, selects a format and style appropriate for the chosen subject and audience, and writes a document that adopts a point of view or makes a recommendation based on those information sources and the student's own critical and creative analyses.

Students should be encouraged to choose a subject that is at the cutting edge of their fields—one that is of current interest, one that they can get genuinely interested in professionally, and one that will provide substantial evidence of their capabilities to prospective employers.

How many students can write a professional journal article this early in their careers? Not many, but that isn't the point. They are ready in all respects except experience. After they get into their fields, do some research, get some experience, accumulate some hard data of their own, they will be ready, and through this assignment they will have mastered the procedural details that professional writing requires.

This is not an easy assignment for students, but once again they are writing not to impress the teacher but to inform their professional peers. Since the selection of a topic is so important, students should prepare a proposed topic analysis and research plan early and present it orally to the class. Since students are often more sensitive to the opinions of their peers than to those of their teacher, the class should evaluate the appropriateness of the topic and whether it is too broad or too narrow. They can suggest ways of narrowing topics, alternative topics, and additional sources of information. Unfortunately, students have very little professional contact with students in other disciplines, and this is one of the few opportunities for meaningful interdisciplinary exchange.

In conjunction with the research for this final assignment, students may write a letter of inquiry to an authority in the area under investigation, an assignment that provides source material but also gives further experience in letter writing and in building professional contacts.

Two weeks before the final assignment is due, students submit their final topics, abstracts, outlines, and lists of major resources; this document becomes their contract with you. Do not permit further changes in subject matter except in a dire emergency, in which case the change must be justified in writing and approved. This contract eliminates those surprising last-minute changes of subject that make a teacher wonder whether students really did the work themselves.

Exposition, Style, and Editing

The assignments outlined above not only form the structure of the course but also provide opportunities to teach technical exposition, style, and editing. The presentation of technical material, however, requires major emphasis. The writer must keep in mind the importance of orienting the reader first through a title or subject line, then through a concise summary, and finally by developing the subject according to a previously announced arrangement of logical, discrete, and labeled elements. Since the purpose of technical writing is to reveal, not conceal, students should be taught various ways of presenting technical information to show relative importance, similarities, and differences. They should also understand the principles of page arrangement and document design.

To teach style you may present your own version of Gunning's principles and several methods of checking style, including the Fog Index, a Concreteness Index, and a Presentation Index. For the correction of individual errors, refer students to the appropriate pages of their textbooks. Students should also be encouraged to examine the writing styles and methods of exposition used in publications in their fields.

Since the English teacher qualifies as a general reader for technical writing, he or she should be able to teach students to avoid ambiguity and to explain technical complexities in lay terms. As the teacher leads students to define terms, to correct logic, and to strive for simplicity, the technical terms and concepts become more familiar and the instructor's questions ever more precise and meaningful. In fact, the danger is that the teacher may become too much of an expert and forget to insist that jargon be eliminated.

Last-Day Exercises

On the last day of class, schedule a final in-class writing exercise. A favorite, to be done with closed book after all final papers have been turned in, is to ask students to write a letter of transmittal to accompany the technical article to a professional journal. During the course, the role of transmittal letters is often stressed but rarely assigned, so this exercise completes the cycle. If a student has been perceptive enough to attach a transmittal letter to the technical article, he or she may be excused from class. Since a transmittal letter contains a concise summary of the paper, this exercise helps to evaluate the student's real knowledge of the subject. The occasional plagiarizer will be unable to write an acceptable summary of a paper he or she hasn't written.

Another farewell assignment is to have students write a memorandum to you explaining how they plan to keep up to date with the literature in their fields after graduation. This can be an open-book exercise or given as a homework assignment, but it is an excellent conclusion because it involves many of the elements of the course, including career objectives and plans, information resources, presentation of data, persuasiveness, and correctness.

Conclusion

After you have taught a relevant course in technical writing, you will have a sense of accomplishment that you may not have experienced before as a teacher. As you gain confidence, you will take delight in devising new strategies and assignments that meet the needs of your students. You will see them turning into professionals before your eyes and because of your efforts—what more could a technical writing teacher ask?

6 A Comprehensive Skills Approach to Course Design

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The economy of the United States has become an "information economy." According to the Commerce Department, the information economy now accounts for 46 percent of the Gross National Product and nearly half of the nation's work force. This expansion of complex communication activities requires new communication skills for employees. By analyzing the communication tasks that employees face, by integrating speaking, listening, and reading with writing assignments, by linking one assignment with the next in an effort to create complex rhetorical situations similar to those employees experience on the job, and by structuring assignments according to a cognitive rationale derived from discourse theory, technical writing instructors can better equip their students for the rhetorical problem solving that lies ahead.

In 1952 W. K. Bailey, Vice-President of Manufacturing for the Warner and Swasey Company, addressed the Conference on College Composition and Communication. He used the occasion to express his frustration with an all-too-common corporate problem: ineffective communication. The communicator, he noted, must be able to state complex subjects in simple terms; industry needs "people who can think—who have had some training in thinking—who can distinguish between cause and effect both in the concrete and in the abstract, and who can so express their conclusions that they are accepted by others."[1]

Bailey's remarks may have been a symptom of the nation's transition from a manufacturing economy to what the United States Department of Commerce termed twenty-five years later "an information economy." The information economy accounts for 46 percent of the Gross National Product; nearly half of the nation's work force produces, processes, or distributes information "goods and services."[2]

In response to this expansion of complex communication activities, two-year and four-year colleges have added technical communication courses to their programs.

In the early days of technical communication instruction, course designers had no substantial body of knowledge to draw upon concerning on-the-job communication responsibilities. Instructors based their courses on the few textbooks available at the time and sought guidance from a small number of more experienced teachers. Except for a chance meeting with a former student, instructors knew very little about the actual communication responsibilities of their graduates. Without that information, it was impossible for them to know whether the instructional needs of their career students were being met. More recently, however, instructors have defined those needs by conducting field studies of technical employees.[3]

This kind of inquiry has only just begun, but it has already changed our perceptions of the work environment. Field studies using survey questionnaires and open-ended interviews have revealed the *dynamic* nature of technical discourse. Solving rhetorical problems at work seldom resembles the writing exercises most technical employees completed as students. Unlike many classroom assignments, writing done at work does not occur in a vacuum. One technical assignment may produce several communication tasks: an oral briefing, a telephone call, a letter, a report—each involving a different audience and purpose. The writer may draw upon information contained in departmental minutes, in filed letters and reports, in trade journals, and in documented conversations and telephone calls. In short, the writer is a participant in a dynamic process.

Technical communication courses, therefore, should be designed so that students participate in real or simulated rhetorical situations. To simulate work conditions in the classroom, speaking, listening, and reading must be integrated with writing assignments. The assignments themselves are rhetorical situations based on field study data and linked one to another. Thus do these interrelated assignments simulate the continuously changing rhetorical situations technical students will experience on the job, situations in which the information they generate from their technical tasks is abstracted (i.e., selected) for different audiences and purposes in a succession of messages. Moreover, contemporary theories of discourse suggest that such a comprehensive skills approach can improve the ability of students to work with ideas at different levels of abstraction and thus improve their verbal reasoning.

This paper presents a brief task analysis of the two-year graduate's role as communicator based primarily on data from a study of Michigan community college vocational-technical graduates.[4] The implications of this analysis for course objectives are then discussed within the context of pertinent theories of discourse. Sample assignments follow this discussion.

Task Analysis

The community college vocational-technical graduates in the Michigan study represented a wide range of occupational programs in business, technology, and law enforcement. The principal objective of the study was to determine the nature of the rhetorical situations these graduates face. What kinds of communication tasks are assigned to them and how complex are these tasks?

Communicating data is the most commonly assigned task; over 80 percent of 237 respondents indicated that they received requests for data. The term *data* refers here to relatively raw information such as parts lists, names, and dates. However, these graduates do more than gather and transmit data. Nearly half of them are also asked to prepare progress reports and over 40 percent to formulate suggestions that affect policies and procedures.[5] Such messages require the skills of analysis and interpretation, problem-solving skills of a high level. The writer of a progress report, for example, must gather raw information, analyze it, and evaluate it in terms of its value to the rhetorical task at hand. Do the facts demonstrate something about an abstraction called "progress"? How is progress measured? By what criteria will the audience evaluate progress? Projects, whether in private industry or government, require technicians to deal with timetables and performance criteria, and these two factors are vital for them to consider when analyzing audience. It is precisely these two items that enable an audience to determine whether or not an organization's goals are being reached. How accurate that determination is depends largely on the writer's skills of analysis, interpretation, and communication.

In addition to revealing the highly cognitive nature of the communication tasks assigned to graduates, the Michigan study also revealed the importance of speaking and listening to writing. Graduates relied heavily on oral communication in transmitting data, reporting progress, and making policy or procedure. In fact, 78.7 percent of the graduates said information obtained originally from telephone conversations ends up in written messages.[6] Compared to the telephone call, letter, memorandum, and standardized form, however, face-to-face conversation was the dominant mode of communication. Speaking and listening skills, therefore, seem crucial for the accurate gathering and analysis of information that will appear later in written form for decision-making purposes.

Using an open-ended interview technique rather than a survey questionnaire, Professor Jone Rymer Goldstein also found that oral communication linked closely to writing tasks. These tasks included quickly drafted minutes of meetings and records of interviews, phone calls, presentations, and trips. From this discovery, Professor Goldstein created course objectives for impromptu composing and the "translation" of speech to writing—"selecting, organizing, and adapting material for a new form and purpose."[7]

These communication activities account for a large portion of the graduate's work time. According to Professor Harold Erickson's survey of employers of graduates from two-year vocational institutes, technicians spend about 30 percent of their time communicating orally and about 10 percent of their time reading technical articles. Erickson's study also underscored the importance of good listening.[8]

Speaking, listening, reading, and writing act together in what James Moffett has called the forging of thought itself through discourse.[9] However, the final form of that written message is the product of many rhetorical choices. Deciding *how* to arrange the content according to the reader's needs and *what* content to use comprise the two most important writing concerns of the Michigan community college graduates. Fifty-seven percent of 231 respondents found organization to be a writing concern; nearly 44 percent found providing sufficient details (adequacy of development) of concern. Spelling was an expressed concern of 34 percent, but only about 15 percent were concerned about grammar and 14 percent about punctuation.[10] Nearly one-third of the Michigan graduates reported that their writing had been openly criticized at work. It would be interesting to know how many of their messages failed because of poor organization or undeveloped ideas.

If the results of Professor Soichi Uehara's study of writing errors at Kapiolani Community College are representative of problems in job-related writing, the criticism experienced by the Michigan community college graduates may well have been due to reasoning errors. After analyzing the writing of her career students, Uehara discovered that their problems consisted chiefly of reasoning difficulties rather than usage or mechanical errors.[11] It is important to mention that nearly all students in the study had completed an expository writing course before enrolling in Uehara's business communications course. Uehara concluded that texts and instructors have assumed that students already know how to select ideas and arrange them for a particular audience to achieve a specific objective and therefore have concentrated instruction on grammatical and mechanical concerns.

To improve Kapiolani's business communications course, Uehara designed assignments according to case studies that provide a situational context for writing. In addition, students no longer write in a vacuum. Kapiolani's new objectives for the course are realized through class discussion. Discussion and its attendant skills of speaking and listening have been linked with written communication to facilitate thinking.

Discourse Theory: A Cognitive Rationale for Course Design

James Moffett's and James Britton's theories on discourse and curriculum planning relate to issues in technical communication instruction because each perceives discourse as a dynamic process.[12] In everyday discourse, they tell us, we constantly make adjustments as rhetorical situations change. Such adjustments seem to happen almost automatically in everyday conversations, but written discourse requires us to plan more carefully and to make more deliberate rhetorical choices for an unseen audience in order to achieve a specific rhetorical purpose. The writer who selects and arranges content to reflect his or her own concerns, values, and needs without considering the needs of audience suffers from a kind of egocentrism.

To deal with the problem of egocentrism, Moffett recommends a sequence of assignments that range from lower- to higher-level abstractions. Purpose and audience change in these interrelated assignments, and these changes require students to adjust their discourse according to the rhetorical situation. The approach makes students more aware of the process by which they select information at different levels of abstraction for use by different readers. Moffett's objective is not simply to move students to higher levels of abstraction, but rather to help them practice at all levels so that they will be able to play the entire scale. Since technology enables us to store and retrieve information, says Moffett, we must now focus on those cognitive skills required for determining what that information means and communicating what has been abstracted from that information. Abstracting for an audience involves arranging that information and conveying it in a style that meets the needs of that audience.

Moffett's abstraction levels in discourse, from particulars contained in a narrative structure to classes of generalizations contained in assertions, are these:

> Level one: What is happening/what has happened—chronologic of perceptual selectivity
>
> Level two: What happened/what was happening—chronologic of memory selectivity
>
> Level three: What happens—analogic of classification
>
> Level four: What may (will, could, etc.) happen—tautologic of transformation[15]

This hierarchy has been developed further by Britton and colleagues, but Moffett's simpler model serves to illustrate this cognitive rationale for sequencing assignments.

Level one, called "drama," is the most fundamental because it represents raw data processed as information via the observer's immediate perceptions. Writing at this level is simply *recording* direct observations of phenomena. Level two is narrative, the "what happened" as compared to level one's "what is happening." Writing at this level is limited to reported events; it is separated from raw data only by the editing performed by the writer's perceptions and memory. There is little conscious selection at this level. Level three, however, consists of many narratives or reportings now drawn together into a generalization. Our analytical skills enable us to place specific analogous events into general classes. For example, Arnold Toynbee, says Moffett, studies historical events in several societies, classifies some events as stimuli and others as responses. The product is an historical hypothesis. Moffett calls this process of formulating generalizations out of many specific narratives the "analogic" of class inclusion and exclusion. Level four's "tautologic" consists of high-level deductions commonly associated with the scientist or mathematician. This is the realm of what might be; it is the capacity to predict. This capacity exists because of the lower-level abstractions that precede it. These earlier stages of abstraction are now represented in another symbolic form, embedded in definitions or equations.

The student's proficiency with levels of abstraction can be enhanced through group discussions. Taking on the roles of sender and receiver, the student becomes a participant in the forging of thought through discourse. Student talk in the classroom, generated by a rhetorical situation such as a case study, has an important impact on the development of ideas and on the quality of written expression. As

James Britton and colleagues observe, discussion within groups of students as well as throughout the entire class gives a "boost" to the incubation of ideas for writing assignments. Talk is central to the process of writing, they argue, because "the rapid exchanges of conversation allow many things to go on at once—exploration, clarification, shared interpretation, insight into differences of opinion, illustration and anecdote."[14] Discussion widens the writer's consciousness of audience and purpose. The quality of individual work is improved by the oral exchange of ideas in small groups of students.

A comprehensive skills approach in a technical communication course may improve the student's verbal reasoning as well as simulate the process by which information is derived and used on the job. The integration of speaking, listening, and reading with writing assignments can provide that "forging" of ideas that occurs in actual discourse. Students themselves can contribute the raw material for assignments by drawing on their knowledge of their own particular occupational specialities. On-the-job rhetorical situations can be simulated in the classroom, thus requiring students to abstract from a subject for an audience at varying levels. Such simulation is best achieved when students have completed at least the first year of their two-year occupational programs and are looking forward to graduation and employment in their occupational fields. By this time, especially in the second semester of the sophomore year, the career student has become an expert in a particular field and can draw upon a substantial body of technical knowledge for writing assignments. These assignments would range from the concrete to the abstract, beginning with recording.

Sample Assignments

The assignments that follow suggest how classroom activities based on field study data may be structured according to a cognitive rationale derived from discourse theory.

Trip Report

Begin the course with a field trip to a local manufacturer. Require students to record what they see and hear during the tour. This task can be divided among groups within the class so that each group is responsible for recording a particular phase of the tour, for example, a certain stage in the manufacturing process. Companies often distribute pamphlets that review the tour. Require students to read this literature for the next class.

Set aside the class period following the field trip for a discussion of the tour. Each group reviews the tour, discussing in detail from their notes the particular phase of it that they recorded. Each group depends upon the other for specific information until an accurate reconstruction of the tour is outlined by the class as a whole. The give-and-take of the discussion demands careful listening, feedback, and elaboration. The class outline serves as the raw material for individual reports addressed to class members (real or hypothetical) whose absence prevented them from going on the field trip. A situational context is established for the report. For example, absent students need a brief but accurate summary of the principal manufacturing processes presented in the tour in order to pass a quiz in the Manufacturing Processes course.

Employment Letter and Resume

The tour can lead to a discussion of the kinds of technical occupations required to operate and maintain a manufacturing complex, and that discussion can be tied in with the employment letter and resume assignment. Scheduling this assignment early in the term allows the instructor to tap a natural source of motivation—the desire for employment in one's field of specialization. Treat the assignment as a kind of report. It does, in fact, require students to select pertinent information about themselves and arrange it in a format that allows audiences to locate the information they need easily. The assignment works best when students write in answer to job advertisements, for they must then adjust their messages to the job description, matching specific qualifications with specific requirements.

Emphasize that the employment letter is written to obtain an interview; that is its instrumental objective. Examine "successful" letters on the overhead projector, concentrating on principles of content, organization, tone, and format that worked to make them successful. The employment letter/resume is a product that students should retain for actual use later on, but the instructor should require them to revise it until it meets minimal criteria for acceptance. The importance of careful editing becomes vitally clear to students on this assignment because its instrumental objective is linked directly to their personal goals.

Mock Interview

Tie the employment letter/resume assignment to the mock interview. This assignment develops the student's interpersonal communication skills. Prepare the class for the assignment by having each student research a prospective employer. The interviews should be videotaped so that students can analyze their performances.[15] A student's success depends largely on how well he or she prepared for the interview through background reading and research into the prospective position and company and by what was discussed in class regarding the kinds of questions asked most frequently by interviewers.

Advantages of These Assignments

These three interrelated assignments offer several advantages. First, a rhetorical situation (written and oral) is set up in the second and third assignments that requires students to abstract from information about themselves, their prospective employers, and the particular positions for which they are applying. At the same time, they are abstracting for audiences who will use the information (conveyed in writing and in speech) to make decisions involving the students. These two assignments demonstrate to students the difference between the writer's situational context and that of the speaker, the advantages and disadvantages of each mode.

Second, the levels of abstraction in assignments two and three are somewhat higher than those in assignment one, in which students recorded information obtained primarily from direct observation. In addition, the audience in assignment one is more like the writers themselves. However, the skill of recording from direct observation can also be included in the inverview assignment. Students can be asked to write self-evaluations of their performances in the videotaped interviews (private screenings) based on notes taken as they record their observations. The self-evaluation, then, serves not only to improve interpersonal communication skills but also to provide practice in the hierarchy of discourse as students move from the recording stage to the reporting stage.

Third, the three assignments demonstrate that writing and speaking, listening and reading, are interrelated processes used to secure instrumental objectives. They can be used well or poorly, resulting in desirable or undesirable consequences.

Role Playing and Interrelated Assignments

A series of interrelated assignments involving role playing as well as writing, speaking, and reading is also useful in simulating on-the-job communication tasks. These assignments can be based on case study problems with material from occupational programs and field studies general enough for students of various disciplines to respond to. These assignments can be prepared with the assistance of vocational-technical instructors to ensure continuity between occupational core courses and the technical communications course.[16] Drawing material from a range of occupational programs (associate degree level rather than certificate programs) is an asset rather than a liability, since each student plays the kind of role he or she will later have on the job. As a result, the case study problem is examined from a number of perspectives, for example, accounting, engineering, data processing. This arrangement simulates the combination of perspectives usually brought to bear on problems in industry and government.

Role playing also allows the instructor to create a miniature communication system within the classroom. If the information pertaining to the case problem is divided among students according to their career interests, each group will need to communicate with other groups via letter or memorandum to obtain the information they need to solve their part of the problem. Each message can be adjusted to meet the changing rhetorical situation, a situation that students must analyze carefully. Messages with various rhetorical purposes and audiences could, for example, be composed around the following problems:

> *Inquiry messages.* Students initiate and respond to messages seeking information regarding a delayed shipment of parts or materials, a new product or service, a new procedure. Responses to such inquiries may include refusal or inability to help.
>
> *Claim and adjustment messages.* Students initiate and respond to requests for adjustments due to poor service or faulty products and materials.
>
> *Explanatory messages.* Students explain why a request cannot be granted, why a new work procedure or policy is necessary or unnecessary, why an error occurred.

Assignments like these require cooperation among interdependent groups, each depending upon others for information. Such assignments also provide practice in data gathering and information management, in problem solving and audience analysis, in developing rhetorical strategies and selecting format, and in editing. Each member participates by contributing a letter, memorandum, or perhaps an agenda for an oral briefing, and each of these is then reviewed by the group for possible use in the group's official message. Individual members benefit from these reviews, and the instrumental effectiveness of the group's official letter or memorandum is tested by the reaction it receives from other groups. Groups and individuals are senders and receivers, participants in a rhetorical situation in which they test their skills on one another and learn from the feedback they receive.

These assignments illustrate how classroom activities can be developed from field study data and structured according to a cognitive rationale derived from discourse theory. Of course they are not prescriptive. As we learn more about the writer's work environment from field studies, classroom assignments are certain to take on new and different forms; and new rationales will be proposed as work in discourse theory advances. Nevertheless, we can begin now to improve our courses significantly by drawing upon findings in these two areas of inquiry.

Notes

1. W. K. Bailey, "The Importance of Communication for Advancement in Industry," *College Composition and Communication* 4 (March 1953): 11.

2. U.S. Department of Commerce, *The Information Economy,* by Marc Uri Porat and Michael Rogers Rubin (Washington, D.C.: Government Printing Office, 1977), 1.

3. See, for example, Richard M. Davis, "Using Surveys to Improve Courses in Technical Writing" (Paper presented at the annual meeting of the Conference on College Composition and Communication, Minneapolis, Minnesota, 5-7 April 1979).

4. Terry Skelton, "Determining the Instructional Needs of the Two-Year Student," *Teaching English in the Two-Year College* 7, no. 1 (1980): 57-64.

5. Skelton, 58.

6. Skelton, 59.

7. Jone Rymer Goldstein, "Interviewing of Technical Communicators: A Field Study Method for Teacher Preparation" (Paper presented at the annual meeting of the Conference on College Composition and Communication, Minneapolis, Minnesota, 5-7 April 1979), 24 (ERIC Document Reproduction Service No. ED 174 997).

8. Harold P. Erickson, "An Effective English Program for the Technical School" (Master's thesis, Wisconsin State University, La Crosse, 1967), 18 (ERIC Document Reproduction Service No. ED 021 516).

9. James Moffett, *Teaching the Universe of Discourse* (Boston: Houghton Mifflin, 1968), 78.

10. Skelton, 60, 62.

11. Soichi Uehara, "Study of Frequency of Errors and Areas of Weaknesses in Business Communications Classes at Kapiolani Community College," 10-11 (ERIC Document Reproduction Service No. ED 022 451).

12. James Moffett, *Teaching the Universe of Discourse*, and James Britton, Tony Burgess, Nancy Martin, Alex McLeod, and Harold Rosen, *The Development of Writing Abilities (11-18)*, Schools Council Research Studies (London: Macmillan Education, 1975). See especially chapter 2 in Moffett for the discussion of levels of abstraction that follows.

13. Moffett, 35.

14. Britton et al., 29.

15. The videotape as a tool for evaluating interviews is also noted by Ron Carter, "How Do I Teach Technical Writing?" in *Proceedings of the Technical Writing Section of the Ninth Annual (1974) Southeastern Regional Conference on English in the Two-Year College*, 15 (ERIC Document Reproduction Service No. ED 099 844).

16. Joyce Swofford, "Plan Your Technical Writing Course with the Help of Technical Instructors," *Teaching English in the Two-Year College* 2 (Fall 1975): 34-35.

7 The Graduate Survey and Its Role in Course Revision

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Curriculum development is a continuing process at Cincinnati Technical College. Our most recent reevaluation was based on two criteria—the educational philosophy of the college (a cooperative education, associate-degree-granting institution) and the communication needs of graduates. To determine those needs we surveyed recent graduates of the Engineering Technologies Division. Questions on the survey elicited responses in five general areas: problem solving, planning, audience analysis, communication tasks, and use of visuals. As a result of the survey, we are making several changes. The revised content of the course will include both written and oral presentations. In particular, we will develop a unit on the proposal. In addition, we will stress grammatical and rhetorical practices that aid clarity and conciseness of expression.

Curriculum development is a continuing process that includes reevaluation and adaptation. In the spring of 1975 at Cincinnati Technical College, we began revision of the course in technical writing. We reviewed textbooks and settled on one that was organized by writing tasks, such as business letters, instructions, and descriptions of mechanisms. We listed these and surveyed the engineering technology instructors at our institution regarding the relative importance of these kinds of writings. In addition, we interviewed supervisors in firms that employed our undergraduates. After compiling the results of these interviews, we decided on the kinds of writing students would complete in the course. (Later we came to understand the importance of systematic audience analysis and its implications in the design of reports.[1]) We completed a course outline that winter, including goals, objectives, instructional sequence, and evaluation procedures. The question that remained, however, was whether the course was consistent with the educational philosophy of the institution and whether it met the needs of graduate technicians.

According to the Ohio Board of Regents, the primary objective of the technical education program in an associate-degree-granting institution is to prepare students for employment at the end of two years of study. In the standards for the approval of such programs, a technician is described as one who "collects data, makes computations, performs laboratory tests, and develops reports."[2] To find out if the technical writing course was providing the skills needed by technicians on the job, we went to the graduates themselves.

Information about the Graduates

We conducted a survey of the engineering technology graduates of Cincinnati Technical College who had been granted associate degrees in 1974, 1975, and 1976. We received 181 responses, 43 percent of the questionnaires delivered. The questionnaire was divided into two sections. The first part requested identifying information (not including the name of the respondent) and employment status; the second and more detailed section requested information identifying on-the-job activities.

Questions in the first section gave us information on the technologies of respondents (Table 1). Responses were received from former students enrolled in all current programs offered by the Engineering Technologies Division.

Table 1

Responses by Technology

Technologies	Responses
Air Conditioning	36
Aviation	11
Biomedical Electronics*	1
Civil Engineering	22
Communication Electronics*	3
Electrical Power	14
Electro-mechanical	23
Electronics	25
Industrial Engineering	6
Mechanical Design	22
Plastics	18
Total number of responses	181

*Option added in 1975

Responses to questions on employment status allow us to conclude that the stated mission of the college—to prepare students for immediate employment through a combination of technical and cooperative education—is being fulfilled. Ninety-four percent of the respondents had participated in the co-op program. Fifty-four graduates were employed by their cooperative employer, while 127, or 70 percent, were not. Only 10 graduates, 5.5 percent of the respondents, were enrolled as full-time students at four-year colleges or universities. Seventy-two percent of the respondents stated that their jobs were directly related to their areas of study. Since an implied goal of the college as well as the writing program is to provide students with skills for upward mobility, graduates were asked if they had been promoted. Sixty-two percent (107 respondents) stated that they had been promoted since joining their employer. The median length of employment for those promoted was 24.4 months.

Engineering technology graduates work in a diverse employment market, and respondents identified 120 businesses and agencies at which they were employed. An analysis of employers shows that they range in number of employees from as few as three to as many as 12,000. Forty percent of the graduates were employed at companies characterized as small (fewer than 100 employees); 32 percent worked in companies characterized as large (more than 500 employees). The type of market served by these companies ranged from local (36%) to national (17%) to international (33%).[3]

Information about Activities on the Job

The second section of the survey requested information concerning on-the-job activities. Recognizing the diversity in employment, we sought areas of commonality and settled on five that we thought would reveal important aspects of the communication environment of the graduates: problem solving, planning, audience analysis, nature of communication tasks, and use of visuals.

Problem solving. In solving job-related problems, 92.7 percent of the graduates responded that they function under their own supervision at least occasionally. On the other hand, when asked if their work was part of a team or department effort, 88.6 percent responded that they perform as members of groups. These seemingly contradictory answers indicate that although there are many situations in which the technicians work alone, there are also many times when they interact with others in solving job-related problems.

Planning. Respondents clearly indicated the need for planning on the job. Before beginning a project, 96.6 percent affirmed that they determine mentally or on paper what they must do to complete the job successfully.

Audience analysis. Planning is obviously an important part of problem solving, but we wondered if planning would carry over to the analysis of the audience for a given written communication. One of the more difficult concepts for students to grasp is the need to view their writing in terms of its possible effects on the organization. For this reason, we asked the graduates whether they identified their audiences as individuals or as a general audience when they planned the structure and content of a written communication. Sixty-five percent of the respondents identified their audiences as individuals; 28 percent conceived of a general audience; only 7 percent did not consider audience. These responses suggest that consideration of intended audience is a major factor in the planning of written communications on the job.

Writing tasks of technicians. Another consideration is the types of writing tasks technicians complete and the value they place on these tasks. We directed some questions to co-workers and supervisors as well. Those directed to the technicians concerned business letters and process writing. Responses are summarized in Figure 1. When asked if it was necessary to know how to write about processes in order to

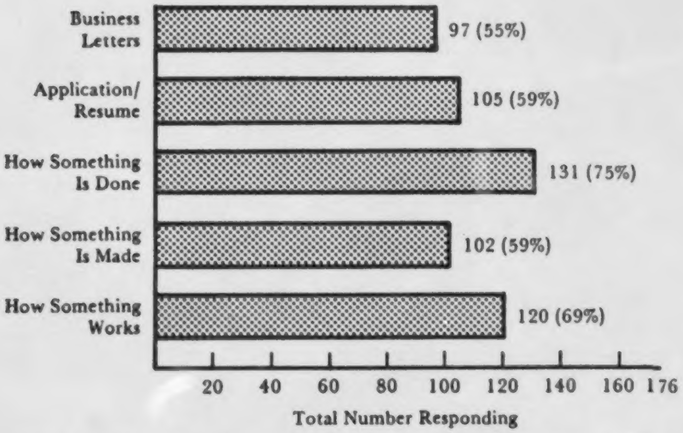

Figure 1. Writing Tasks (percentages adjusted to reflect missing responses).

advance, 108 respondents (61%) answered affirmatively. There was no consensus on the need to be able to write business letters and informal reports in order to be promoted.

Writing tasks of technicians and/or supervisors. When constructing the survey, we considered the possibility that the graduates might be engaged in very limited kinds and amounts of writing. Because we had no formal communication lines open to the graduates, our first-hand knowledge of their communications tasks was necessarily restricted. Terry Skelton's survey of graduates of associate degree programs[4] and Richard Davis's survey of professional engineers[5] present statistics that indicate the nature and importance of writing in the technical world, but neither study was aimed specifically at engineering technology graduates. If our recently graduated technicians were not doing much writing, we would learn little about the communication skills needed for advancement; therefore, we phrased some questions to include the technicians as well as their immediate supervisors and/or co-workers. If the supervisors were performing communication tasks not performed by the technicians, then the technicians would need to know how to perform those tasks if they were to be promoted. One question we asked was if the technicians or their supervisors request information about a job or project. Eighty percent of the respondents made such requests outside the company; 68 percent made them within the company. The greater number of requests for written information outside the company may be explained by the prevalence of informal communication within organizations.

A second question directed to technicians and/or supervisors was related to the problem-solving and planning processes mentioned earlier. When asked if they did research before beginning a project, 132 graduates (74.2%) said that they or their supervisors conducted such research. Methods mentioned were library research, survey research, comparison-experimentation, observation, fabrication of prototypes, interview, and trial and error. Library research had the greatest number of responses; comparison-experimentation was next in number of responses.

Visuals. One question that had surfaced in our plans for updating the technical writing course at Cincinnati Technical College was how much emphasis should be placed on the use of visuals. Survey responses showed overwhelmingly that the use of visuals is an integral part of on-the-job communications for the graduates. Seventy-nine percent of the graduates or their supervisors use them, and more than 91 percent stated that visuals were used at their place of employment.

In order to know which types of visuals should be emphasized in technical writing classes, we asked the graduates to indicate those used within their organization and those used in their particular departments. The results are illustrated in Figure 2 and Figure 3.

Recommendations of the Graduates

Because the graduates had completed the technical writing course and were now in situations requiring various forms of communication, we felt their recommendations would be relevant to our considerations of course content. The recommendation section of the survey contained a list of six areas that receive little or no attention in the

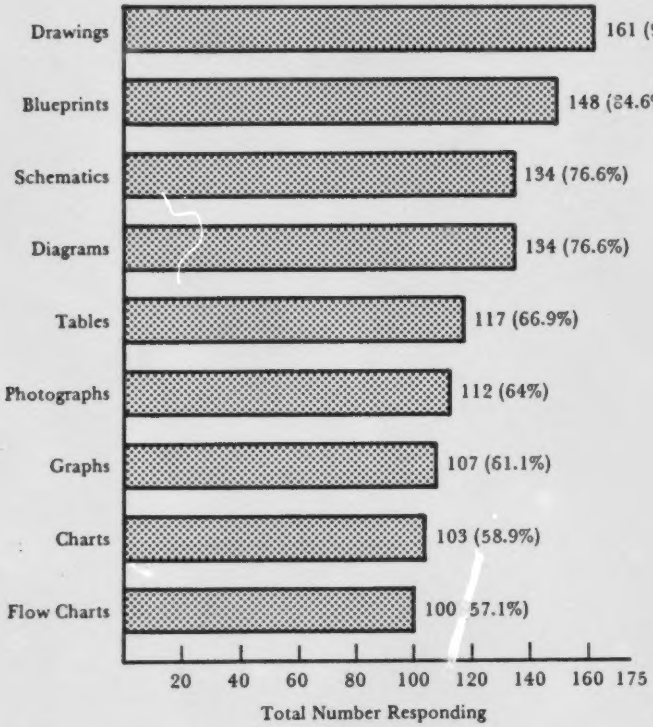

Figure 2. Use of Visuals in Graduates' Organizations.

present technical writing classes. There was also space for the graduates to write in their own recommendations. The results are shown in Figure 4.

Written proposals received the highest percentage of recommendations (48.9 percent). At present, proposals are covered only as an optional part of the technical writing course. The next two recommended topics, writing style and grammar and oral presentations, are not included in the course; yet they were recommended by 41.7 percent and 40 percent, respectively.

The writing of manuals and journal articles has been dealt with at Cincinnati Technical College as a special assignment or project within the student's technology major; however, this type of assignment could also be emphasized as one of the report forms or structured as a separate unit in the technical writing class. For example, a

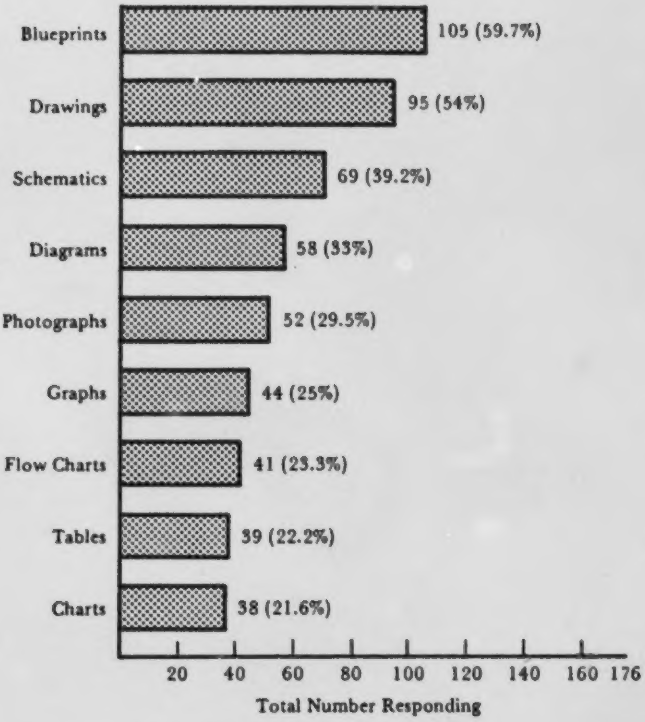

Figure 3. Use of Visuals in Graduates' Departments.

student in electronics recently designed and built a solar-powered battery charger as a final project before graduation. To complete the project, the student might also have written a manual in his technical writing class that explained the unit's design, operation, maintenance, and repair.

The fifth-ranked recommendation of graduates suggested that more emphasis be placed on research methods. Two of them, library research and surveys, are covered in other courses, but other methods could also be considered in these classes so that the students would have a broader research background by the time they take the technical writing course.

Some of the graduates sent examples of the special forms they use most often. Emphasis on the use of these, however, would have to be general because of the many different styles used from organization to organization. One common factor that might be stressed in the classroom is language adaptation for the audience of a given form.

At the end of the recommendation section we asked the graduates to initiate comments of their own. Naturally we welcomed the positive ones, but we felt the negative ones were as important because they

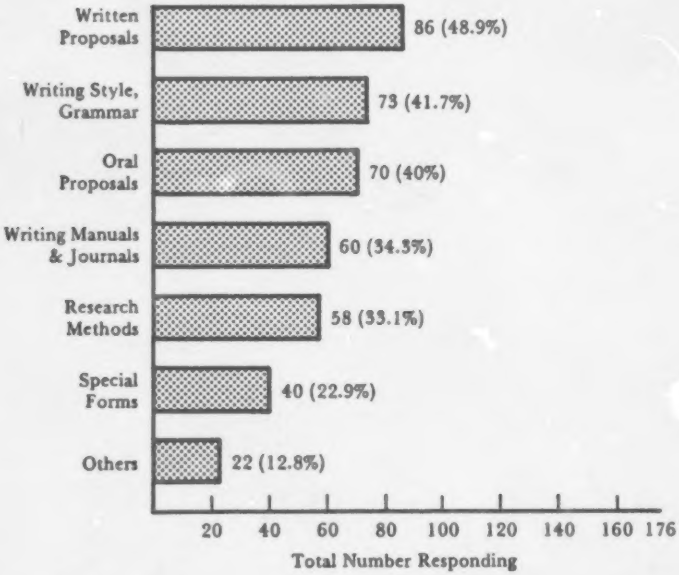

Figure 4. Recommendations of Graduates.

made us look closely at particular areas of the course. What follows are representative comments by the graduates.

> We have to write short, concise change notices, but they have to be to a general audience. It is difficult to word these properly so all understand, especially the shop workers. It is a challenge to write a notice about a different part or finish being added or deleted so that nine different departments understand.
>
> You should stress explanations such as how to describe assemblies, components, procedures, etc., in a logical and clear fashion. Emphasize that any communication, whether written or oral, should be explicit. Too many times people misunderstand each other or details are vague.
>
> Writing communications with the correct style, grammar, and order is most important. Writing that is grammatically correct and follows a logical order shows that an individual has an interest in what he or she is doing.
>
> Stress that the best way to communicate in writing is with language that is simple and to the point.
>
> Graduates must know how to convey in written form the essentials of a particular subject such as a project or other assignment.
>
> Not enough time was spent on internal business communications. I had to read the memos sent to my predecessor to extract ideas on how to communicate with other departments. Writing memos was never really brought out to any degree in college, but it should have been.
>
> You must try to update your courses to be more compatible with those in four-year colleges.

Conclusion

The survey of the engineering technology graduates yielded a great deal of information about the graduates and the tasks they perform on the job. From the data we gathered we formed the following conclusions.

1. A majority of the graduates are employed on a full-time basis.
2. The graduates are employed by 120 different organizations.
3. The majority have been promoted since starting with their present employers.
4. The graduates solve problems as individuals and as members of groups.
5. The majority feel that some type of planning is necessary before beginning a job or project.

6. They consider their audience in the planning and writing of their communications.
7. They do not feel that knowing how to write informal reports and business letters will lead to promotion, but over 60 percent feel that knowing how to explain processes is necessary for promotion.
8. Orally, they make proposals and describe equipment.
9. The use of visuals is an integral part of the communication repertoire of the graduates.

As a result of the survey, several changes will be made in the technical writing course at Cincinnati Technical College. The revised content will include both written and oral presentations. In particular, we will develop a unit on the proposal. In addition, we will stress grammatical and rhetorical practices that aid clarity and conciseness of expression. Finally, we will conduct another search to find a text that more completely meets our revised objectives.

Evidence from the survey indicates that the technical writing course is consistent with the educational philosophy of our institution—to prepare technicians for employment upon graduation. We will continue to attempt to determine the needs of graduate technicians and to adapt the course to meet those needs.

Notes

1. J. C. Mathes and Dwight W. Stevenson, *Designing Technical Reports: Writing for Audiences in Organizations* (Indianapolis: Bobbs-Merrill, 1976).

2. Ohio Revised Code #3333-1-04, "Standards for Approval of Associate Degree Programs," Fourth Draft, October 9, 1978.

3. Information on markets served and number of employees was obtained from the *1978 Business and Industry Directory of Greater Cincinnati* (Cincinnati, Ohio: Greater Cincinnati Chamber of Commerce, 1978).

4. Terry Skelton, "A Survey of On-the-Job Writing Performed by Graduates of Community College Technical and Occupational Programs," in *Technical and Professional Communication: Teaching in the Two-Year College, Four-Year College, Professional School*, ed. Thomas M. Sawyer (Ann Arbor, Mich.: Professional Communication Press, 1977), 17-23.

5. Richard M. Davis, "How Important Is Technical Writing? A Survey of the Opinions of Successful Engineers," *The Technical Writing Teacher* 4, no. 3 (Spring 1977): 83-88.

Part Three: Broadening the Basic Course

8 Writing: An Institutionwide Approach

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Rochester Inst[illegible] of Technology

The continuing efforts of writing teachers to produce by themselves competent technical writers seems to be failing. At Rochester Institute of Technology (RIT), writing has become an institutional concern. The writing programs described here are undertaken by individual faculty members, by departments, and by colleges who are requiring competent writing from their students in addition to accurate content. RIT's developmental education unit provides support through a writing lab that focuses on writing as a process and on individualized instruction, and through writing specialists who work with faculty to integrate the teaching of writing with content courses. The underlying assumptions behind these efforts are that students do not fully develop writing competency in one or two ten- or fifteen-week courses and that the maintenance of writing skills requires continuous practice. RIT's administration has mandated this emphasis on writing because employers who hire RIT graduates are demanding competent writing.

"Our graduates can't write. What are *they* teaching in those composition classes anyway?" We, the *they* who teach writing, continue to attempt to teach future technicians and business persons to write clearly and concisely. We experiment with new ways and recycle old ways; we devise innovative strategies, and then we return to the basics; we reduce our expectations, or we set more stringent requirements. But the situation doesn't seem to change.

At Rochester Institute of Technology (RIT), we have begun to view writing as an institutional problem, acknowledging that faculty in all content areas are responsible for graduating competent writers. This institutional posture means that instructors of writing must make simple but drastic changes in their professional stance. We must let go of the possessiveness we feel for our art and expertise, and we must expend time and energy training and encouraging colleagues who teach engineering and sociology and business to teach writing. Those of us who write realize that writing skills, like the skills required in a sport, deteriorate without use; and those of us who teach writing realize that many students write capably only when they are required to do so. But we must convince our colleagues that students who take only multiple-choice exams and tests requiring mathematical computation may actually write more poorly when they leave us than they did when they came to us from high school. Although the program described here is being implemented in a large four-year institution, its underlying concepts can be applied to other institutions of higher education—large or small, two-year, or four-year.

Early Identification of Needs

The sooner writing problems are identified, the better. In the past many students managed to make it through the first two years at RIT only to drop out in their junior or senior years because the requirements, including writing, suddenly got tougher. Now, a student's writing is tested when he or she enters as a freshman or new transfer student. If necessary, recommendations for remediation are made, and the student is placed in one of three levels of freshman composition. In addition, the College of General Studies, which offers liberal arts courses, has established a writing policy that requires a 1250-word writing assignment in all courses. Since these courses are dispersed throughout a student's curriculum, this requirement keeps students writing throughout their educational experience.

A Writing Lab to Complement Freshman Composition

The primary source of writing instruction at RIT remains in the freshman composition course, but changes have been made and backup has been added. In addition to initial testing and placement, every student must pass an exit test in order to receive a passing grade, regardless of class average. These essay exams are scored by the writing faculty, but no instructor scores the tests of his or her students. A student who fails the test must negotiate with the instructor a contract to work in the Writing Lab of the Learning Development Center.[1] This contract stipulates the skills which the student must acquire in order to write acceptably (for example, organization, punctuation, thought development, use of complete sentences, use of subordination). Upon completion of the contract, the student takes another exit exam. A student may repeat the process for two quarters; however, all but a very few students pass the exit exam after one ten-week period of individualized instruction in the Writing Lab. This procedure is based on the assumption that many students cannot become competent writers in a ten-week course and that repeating the course is of little help. That assumption is of critical importance and bears some amplification.

Students who have problems writing need strategies and processes that work for them. Outlining, for example, may be included in the composition course, but some students may not understand its value as a process. They may never have been led through the process of logical thinking that on paper becomes an outline, or they may not see the outline as a tool for remembering and for staying on the track. Although teaching outlining helps some students, it will not help others. For the student whose style of thinking is random, outlining often produces only frustration and confusion. This student, who fits ideas together by working them through in sentences and paragraphs, may become comfortable with writing only by rebelling against the instructor. Students who fail writing classes are seldom incapable of writing! They may not learn from a particular teaching style or they may not learn quickly enough to satisfy the requirements in a ten- or fifteen-week course. Because it is impossible to meet every student's needs in a large class, an additional structure—in this case the Writing Lab—is essential.

Technical Writing Courses

In addition to General Studies writing courses, which all RIT students must take, some science and engineering programs require a conventional technical writing course. These courses have been helpful in upgrading writing abilities and many students voluntarily use the Writing Lab to improve their skills in order to meet course requirements. However, like the liberal arts composition course, technical writing courses can not generate the extensive demand for writing that is necessary if graduates are to be competent writers.

Institutional Writing Programs

The programs discussed here integrate writing instruction with content in existing required courses. Conceptually, they are similar and based on the demands of individual professors, departments, and colleges that students turn in work that is competently written as well as accurate in content.

Individual Professor Initiative[2]

Some professors have invited writing specialists into their classrooms to instruct students in techniques for approaching particular assignments—a physics lab report, research paper, marketing study, book review. A team approach is often used. The content professor answers questions about the material to be included while the writing specialist discusses problems of organization and how to handle mechanics and style. Students are told that the quality of their writing will be evaluated as well as its content, and they are encouraged to make use of the Writing Lab. In some cases, the writing specialist works with the content instructor to establish criteria for evaluating the quality of the writing. As a result of this approach, students improve their writing skills through practice, and content professors learn how to critique writing so that in the future they can discuss writing problems without the aid of a specialist. The most exciting part of the interaction often occurs for the content professor who exclaims, "I knew that didn't sound right, but I didn't know what to call the error, and I couldn't tell the student how to fix it."

Departmental Writing Programs[3]

In some departments writing is an integral part of the curriculum (physics and mechanical engineering lab reports, for example), and students must demonstrate competency on required writing assignments in order to receive credit for the lab.

In one program in Mechanical Engineering Technology, a writing specialist and members of the content faculty conducted a special writing lab to assist students in improving their reports. Students who demonstrated competency in writing on several reports were no longer required to attend the writing lab. Students were also required to demonstrate competence in writing a technical letter in order to exit from the program. All writing was graded by the engineering faculty. After a year, the content faculty were fully trained to run the writing lab without the aid of the writing specialist. The program was then expanded to include instruction in the writing of letters and reports, and credit was assigned to that work.

A similar project in an introductory physics course taught in large group lecture and small group labs integrated writing instruction with the preparation of lab reports. Here the writing specialist trained upperclass students as readers and helped to coordinate the efforts of the five professors who taught the labs.

One College's Commitment to Writing

The most sophisticated writing program outside that of the College of General Studies has been undertaken by the entire faculty of the College of Business. The writing skills of first-quarter sophomores, who have had a composition course, and of new transfers are evaluated with an essay test that is scored holistically by the entire College faculty. Writing specialists train the faculty to score the tests, review student papers that are rejected, and make recommendations for instruction. Students whose writing skills need improvement are referred to the Learning Development Center by their advisors. Students are again tested at the end of their junior year and those who are not competent writers are required to undergo remediation before they are allowed to graduate.

To ensure that students in the College of Business get enough practice in writing, specific courses in each curriculum include writing assignments, and these papers are evaluated for quality of writing as well as for accuracy of content. Some instructors use essay rather than multiple-choice exams and others include memos, business letters, and reports as part of simulated business activities in courses ranging from office practices to marketing. Even math and statistics professors assign tasks requiring the verbal explanation of concepts.

Support from the Administration

Efforts to answer student writing needs are sanctioned and encouraged by upper-level administration at the Institute. An Institute Writing Committee made up of the Dean of the College of General Studies, the Writing Coordinator, and a representative from each college sets policy and encourages and coordinates writing activities throughout the Institute. Colleges and departments are mandated to require writing competence from their students and to have on record their writing programs and requirements. In some cases, monies have been made available for experimental programs or to initiate changes. This support has come directly from the deans or from the office of the Provost.

Implementation Problems

Of course, the development and implementation of these programs have not come about without problems. Some faculty resent the additional work load, and in the beginning some writing instructors feared their territory would be usurped by the developmental education writing specialists and the content faculty. It also takes a long time to establish programs; some of the efforts described here were begun eight years ago. And it takes time to change faculty attitudes, to make faculty aware that a student who successfully completes a freshman composition course is not assured of graduating as a competent writer. But we've had help in convincing our faculty that we must undertake an all-out effort to improve student writing: the employers who hire our students have demanded that we do so. The task of devising and implementing writing programs is by no means finished, but we certainly have an institutewide concern for writing, and that's the first step.[4]

Implications for Two-Year Programs

Forty percent of RIT's students are transfers from two-year programs elsewhere. These transfers consistently score lower on the test of standard written English than do incoming freshmen. These transfer students report that they have done virtually no writing in college since freshman composition. Seventy percent of the transfers who took the College of Business test wrote unacceptable essays but sophomores who took a similar test after their freshman composition courses passed. This evidence seems to support our hypothesis that writing skills deteriorate without use and that freshman composition has only a temporary effect.

Students who attend two-year programs leave those programs to continue their education or to enter the work force. In either case, they need to be competent writers. As educators we have a responsibility to provide for that need. The program described here can be transplanted to two-year institutions. Although writing specialists from the Learning Development Center play an important role in developing writing programs at RIT, the developmental education unit is not essential. An energetic English faculty can undertake institutionwide programming (1) by setting up a structure in which writing instruction is individualized and treated as a process; (2) by enlisting the cooperation of the faculty in other disciplines to integrate writing into their curricula; (3) by training faculty in other disciplines to work with students on writing problems; and (4) by seeking administrative support for these efforts. What an institutionwide approach really takes is a change of focus and a redirection of energies.

Notes

1. The Learning Development Center is the developmental education unit at RIT. Learning specialists in reading, writing, and math offer noncredit instruction to support student efforts to achieve success in academic classes. Writing instruction takes place primarily in a lab setting where instruction is directly related to the writing projects required in class. The services of the Center are free of charge and students are encouraged to use them throughout their college career. Writing specialists from the Center are also available to the faculty as consultants on curriculum, teaching techniques, and student writing problems.

2. Further information on individual instructor initiative is found in Harvey J. Edwards, "Writing in Business: A Report on an Experimental Team-Taught Marketing Course" (Learning Development Center, Rochester Institute of Technology, 1976), and in Frederick P. Gardner and Gladys W. Abraham, "A Grading Procedure for Student Writing," *Teaching Sociology* 6 (October 1978): 31–35.

3. Departmental writing programs are also discussed by Walter F. Cuirle and Harvey J. Edwards, "Teaching Writing Teaches Analysis: Physics Lab Reports" (Learning Development Center, Rochester Institute of Technology, 1977), and Harvey J. Edwards, "Writing in Engineering: Final Report of the Project to Improve Technical Communications" (Learning Development Center, Rochester Institute of Technology, 1976).

4. For more information about RIT's writing program, write Gladys W. Abraham, Coordinator of Special Projects, or Dr. Joseph Nassar, Institute Writing Coordinator, at the Learning Development Center, Rochester Institute of Technology, P.O. Box 9887, Rochester, New York 14623.

9 Establishing a Technical Communication Program at the Two-Year College

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Waukesha County Technical Institute

This paper, based on Waukesha County Technical Institute's experience, offers five suggestions for two-year colleges interested in establishing technical communication programs. (1) Work closely with an advisory committee and local industry to define the field of technical communication. (2) Carefully identify the students to be served by the program and develop a curriculum that fits their needs. (3) Consider the advantages of offering technical communication as part of a continuing education program. (4) Provide resources so that teachers can prepare themselves to teach technical communication. (5) Move with deliberation and care.

Two-year colleges across the nation seem to be taking a fresh and far more interested look at technical writing for a number of reasons. First of all, employers believe that competent writing is important. Richard Davis, for example, found in a recent survey of working engineers—the people who often serve on advisory committees—that 95 percent of the respondents held writing to be important or very important.[1] Then, too, technology continues to increase ever more quickly, and this growth, along with product liability and increasing consumer awareness, has increased the amount of technical writing that must be done. Finally, declining enrollments have brought with them the desire to find new approaches for attracting and holding students. To answer these needs, many two-year schools are developing more business and technical writing courses, and several have initiated entire programs to train technical writers—among others, Golden West College in California, Rock Valley and William Rainey Harper colleges in Illinois, the University of South Dakota at Springfield, and Kalamazoo Valley Community College in Michigan.[2]

In December of 1977 we at Waukesha County Technical Institute (WCTI) began to investigate the possibility of a technical communication program at our school. WCTI is located in the Milwaukee, Wisconsin, metropolitan area, and the concentration of manufacturing and heavy industry convinced us there might be a market for technical writers. Our investigation taught us much about technical writing. Now, four years later, we realize we still have much to learn, but we think our experiences may be helpful to oth[illegible]ering technical communication programs. We recognize, of course, the risks associated with advice-giving, but we believe we have discovered five useful notions about program development in technical communication.

Educate Employers

Our first piece of advice to those who would start a program is to educate employers about your school and about technical communication. Like others who have begun programs, we received a diversity of opinions on the training appropriate for technical communicators.[3] We also found that some industries which obviously depend on their employees' technical writing skills do not recognize this dependency.

After initial investigation, which included requesting information from schools with existing programs and surveying newspapers for want ads for technical communicators, we contacted several local industries to recruit an *ad hoc* advisory committee. The functions of the committee were to help determine whether a need for a technical communication program exists and, if so, to recommend a curriculum. It was from this indispensable group that we became aware of a problem much discussed in technical communication literature: definition of the field. Some advisory committee members saw the technical communicator as a person skilled as a writer while others saw him or her primarily as a technician or engineer. Some believed the person should be acquainted with graphics, print, and production; others wanted people who could write not only service manuals but audiovisual scripts and ad copy as well. We discussed whether we could attract nursing students as medical writers or fashion students as copywriters. In other words, we toyed with many definitions of technical communication without ready agreement that this or that definition precisely described a technical communicator.

The situation became even more complex when, in October of 1978, we sent need surveys to personnel in 85 industries in the Milwaukee area. Of the 45.6 percent who responded, 63.9 percent expressed a need for a program and indicated that they expected to hire 62 full-time technical communicators in the next three years. Further, 85.7 percent believed that current employees could benefit from portions of the program if it were offered at convenient times.

The relatively low response rate is attributed in part to the fact that many companies contacted by phone said they did not have technical writers, even though their engineers and technicians undoubtedly do writing that is technical. Some employers, then, must be "trained" to understand what a particular school sees as technical communication, and discussions with the *ad hoc* advisory committee were invaluable in this respect. Later, when we decided to begin with a few courses instead of a full program, we hoped that employers who had indicated that current employees would benefit from technical communication courses might come to understand our definition and be willing in the future to hire people trained in such a program.

Consider Curriculum

Our second recommendation to those considering a program in technical communication is to provide a curriculum that accommodates diverse students. Such an accommodation is possible only if the types of students likely to enroll are clearly recognized. We at WCTI identified three types: the engineer who needs training in writing, the writer who needs technical training, and the recent high school graduate who needs both. Other potential candidates included people who see themselves as technical writers but are, or believe they are, unprepared to write well; recently single women who, perhaps for the first time, must find employment; and mechanically skilled men who for various reasons want to get out of the "shop."

Each group would enter the program with some skills but without others. Could a single curriculum be designed to accommodate all groups? The various proposals that we developed reflect our thought process, identifying potential students and defining the field along the way.

Our initial curriculum proposal, developed by WCTI's Communication Skills program coordinator, required students to take twelve credits of technical writing and from eleven to fifteen credits in two "technical support" areas. Since WCTI offers degrees in a wide variety of areas—from mechanical design to safety to nursing to welding to fashion, we believed students could choose from existing courses in areas they found of interest.

The advisory committee offered two wise recommendations. First, they suggested we not depend on existent courses to meet our needs. Discussion with faculty from these other areas subsequently confirmed that these courses did not always provide what our students would need. Introductory courses did not provide enough depth, and intermediate courses with no prerequisite in the subject would be unsatisfactory. Many new courses would have to be developed. Second, the advisory committee recommended that we limit the "technical support" areas to electronics, hydraulics and mechanics, data processing, graphics, copywriting, sketching and blueprint reading. They argued that marketing and medical writing are specialties in themselves; our program should be more basic and should train for the most obvious needs of the Milwaukee area, that is, the needs of heavy industry. Specialization could come later.

Our second curriculum proposal, based on the recommendations of the advisory committee and on the work of a curriculum subcommittee, required eleven credits in technical writing and a total of fifteen from the technical areas mentioned above. Some members of the advisory committee were dissatisfied, asking for more emphasis on graphics, copywriting and script preparation. Consequently, a third proposal was drawn up, adding fourteen credits in these subjects but eliminating two technical areas—electronics and hydraulics and mechanics.

After considerable discussion by telephone, letter, and meeting, the advisory committee recommended a fourth curriculum somewhere between proposals two and three. They have asked that this fourth and, we believe now, final proposal require strong training in communications, blueprint reading, problem solving, and research; training in a choice of two technical fields (approximately fifteen credits); and training in graphic arts (approximately six credits).

We seem to have come full circle. Some might say we wasted over a year's time, but we think not. Each curriculum proposal clarified definitions and goals and more clearly identified potential students. We believe segments of our fourth curriculum proposal can benefit each student group we identified.

Consider Continuing Education

As we refined the curriculum proposal to fit diverse student groups, we came to realize that many of these students fall into the continuing education category. As our third piece of advice we suggest that schools look seriously at a continuing education program for technical communication. We believe that two-year schools will depend increasingly on evening and/or weekend programs in general, and, because of the types of students likely to enroll in this program in particular, it seems well suited for such an approach. In addition, WCTI has begun to offer technical communication courses to employees on their jobs, usually at their work sites instead of on campus. This alternative, too, should be investigated.

Prepare Teachers

A fourth suggestion is that teachers be provided with the means to prepare themselves for teaching in a technical communications program.[4] Although there is much to learn, the beginner has many opportunities for self-growth. A number of technical communication journal articles as well as several essays in this collection deal with the problem of the English teacher who feels unprepared to teach that "other" writing course. Both *Journal of Technical Writing and Communication* (Baywood Publishing Company, 120 Marine Street, Farmingdale, NY 11735) and *The Technical Writing Teacher* from the Association for Teachers of Technical Writing (Nell Ann Pickett, Executive Secretary-Treasurer, Hinds Junior College, Raymond, MS 31954) offer useful articles on various aspects of technical communication.

In addition, there are several summer conferences on technical communication. The authors attended Rensselaer Polytechnic's Technical Writing Institute for Teachers, and conferences are also held at the University of Michigan, the University of Washington, and other locations. Particularly valuable to two-year college teachers is the newly established Institute in Technical Communication, sponsored by the Southeastern Conference on English in the Two-Year College and held at the University of Southern Mississippi, Gulf Park Campus. Other sources of ideas and materials for courses and program design are the Association of Teachers of Technical Writing and the Council for Programs in Technical and Scientific Communication (write David L. Carson, Rensselaer Polytechnic Institute, Troy, NY 12181). A local chapter of the Society for Technical Communication may be helpful, or you may write Society for Technical Communication, 815 Fifteenth Street, NW, Washington, DC 20005. Finally, contacts with advisory committee members can lead to summer jobs in technical writing, and while the pay is not likely to be high for the beginner, the experience is invaluable.

Move Carefully

Our last bit of advice, the one we believe by far the most important, is that a technical communication program be developed carefully and perhaps slowly. Our initial proposal calendar was for eleven months and would have resulted in our beginning the program in the spring semester of 1979 (Table 1).

Table 1

Proposed and Actual Calendars for Developing a Technical Communication Program at Waukesha County Technical Institute

Action	First Calendar	Second Calendar	Actual Calendar
Begin preliminary investigation	12/77	12/77	12/77
Submit preliminary proposal (indication of interest) to state	2/78	2/78	2/78
Receive state approval of preliminary proposal	5/78	5/78	5/78
Recruit advisory committee	5/78	8/78	8/78
Notify Research and Development Department of project	5/78	5/78	5/78
Advisory committee meets to discuss ideas for a needs survey	5/78	9/78	9/78
Develop needs survey	6/78	9/78	9/78
Mail needs survey	6/78	10/78	10/78
Develop curriculum plan	7/78	10/78	10/78
Analyze survey results	7/78	11/78	11/78
Prepare draft of proposal	8/78	12/78	12/78
Advisory committee critiques proposal draft	8/78	12/78	12/78
Revise proposal draft	9/78	1/79	3/79
Submit final proposal to school board	9/78	1/79	undetermined
Submit final proposal to state	10/78	1/79	
Receive state approval of program	11/78	5/79	
Implement program	1/79	9/80	

Although we were eager to get underway, we have learned that developing a program may take more time than originally anticipated. More than two years after our target date, we had not implemented the program. Like anyone with an exciting new idea, we felt confident of our ability at the start, impatient to get the program out of the conference room and into the classroom. As we discussed the issues, however, we became less certain of our ability to offer a successful program quickly. We believe that in time we can be successful, but we have been convinced that, for us at least, the way to that success is to offer individual courses in the evenings and to employees on the job. Our object has been to begin on a small scale to demonstrate our capabilities to the community and to further identify the market for ourselves.

During the 1979 school year we developed a technical writing course to be taught off-campus to working professionals. That course has now been taught three times for engineers at the Wisconsin Department of Transportation and is available to industries in the area. In the 1980-81 school year we offered Writing for Technical Communicators, a course to introduce the field of technical writing and give students writing practice. In the 1981-82 school year we began the Technical Writing Workshop, an intensive course in which students with some writing background develop two or three substantial projects.

While these courses were being developed and offered, we worked hard to make counselors aware of them and to encourage them to help us identify potential students. We were especially careful to involve the campus Women's Center so that displaced homemakers and other women would be aware of technical writing as a vocation. We have furthered our contacts in industry and have begun to draw into our courses people who are currently writers and people who work in technical jobs and want to become writers.

Since our student base is expanding and community support is growing, we may soon be able to implement a full-time program. If we do, it will be because a full-time program is needed by students and industry; if we do not, it will be because we are still refining a full-time program or because the need can be better met without it. We have learned to respect and to grow with the process of development, and we hope that others will benefit from our advice to ensure that a technical communication program meets the area's needs and provides the highest quality instruction possible.

Notes

1. Richard Davis, "How Important Is Technical Writing? A Survey of the Opinions of Successful Engineers," *The Technical Writing Teacher* 4 (Spring, 1977): 84.

2. Thomas L. Warren, ed., *Directory of Colleges and Universities Offering Degrees in Technical and Scientific Communication* (Stillwater, Okla.: Council for Programs in Technical and Scientific Communication, 1978).

3. See, for example, Steven M. Garson, "A Proposed, Terminal Two-Year Technical Communication Program," in *Proceedings: Council for Programs in Technical and Scientific Communication* (Troy, N.Y.: Rensselaer Polytechnic Institute, 1980).

4. For an extensive list of teacher preparation materials, see Part Seven of this anthology.

10 Public Communication Internships: An Outlet for Technical Writing

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A public communication internship program in state agencies provides opportunities for students to gain technical writing experience. Students who write quickly and concisely, who adjust to the needs of various audiences, who understand the field for which they are writing and can translate technical jargon are sought eagerly by state agencies, which traditionally have a shortage of personnel with these skills. Such programs can be full- or part-time and can extend for one semester or longer, depending upon the agency, the school, and the number of interns. As a result of such programs, citizens receive clearer information from state agencies and students experience firsthand the significance of technical communication skills in professional fields, an experience that cannot be duplicated in the classroom.

At both state and federal levels, government agencies release substantial amounts of information for the public. As government actions burgeon, their impact must be explained in language comprehensible to the average person. Not surprisingly, people with superior communication skills are sought eagerly by these agencies, many of which are unable to provide full informational services to the public because they lack qualified writers. Recognizing this need, enterprising faculty in community colleges can develop internship programs of considerable benefit to students, to the agencies, and to the public. Just such an effort was launched at Plymouth State College in New Hampshire, a rural institution with a student body of 3500 but limited resources for developing intern programs on a large scale.

Preliminary Survey

The first step in developing the program was to study the writing and publication practices of state government agencies in New Hampshire, with particular attention to technical writing. In this preliminary study, funded by a grant from the New Hampshire Spaulding-Potter Trust, nineteen people in fourteen agencies were interviewed. The interviews revealed that most of the writing in New Hampshire state agencies is confined to technical reports for meeting federal and state regulations along with the production of information pamphlets and news releases. With the exception of one or two departments where several staff members might collaborate on a report, the majority of an agency's writing is done by one or two individuals identified as public information or education officers.

The study also revealed the general qualifications for dealing with these tasks. Most frequently mentioned were the ability to write quickly and concisely, to adjust to the needs of various audiences, to understand the field for which the writing was being done (although this was not considered mandatory), and to translate jargon and obfuscation into easily understood language. Skills in photography, layout, and general journalistic techniques—skills which some college students already possess—were mentioned as desirable.

A willingness to work with student interns was mentioned frequently in follow-up letters of support for the program from the fourteen state agencies. For example, from the Department of Resources and Economic Development: "Student interns would be of great service to our desired goals. They could prepare press releases, stories for press kits, advertising copy, and assist in the research of surveys and other travel-related tasks." Or this from the Department of Personnel: "We would expect that the interns, with a good grasp of the basics of technical writing . . . could contribute materially with minimal supervision and guidance. Writing would be in the area of job analysis, project narratives, press releases, job announcements, letters to public officials, design of job analysis questionnaires, drafting of specifications, and updating of existing specifications."

With this kind of support and interest from the agencies involved, two general program objectives were established: (1) To provide state agencies with qualified interns who can perform valuable services in promoting written communication with the public. (2) To provide selected students with an opportunity to explore career opportunities that call for technical communication skills.

Screening

To qualify for the program, a student must have nine credit hours of academic or comparable experience in writing, with at least three of those credits in technical writing. No writing course in which the student earned a grade lower than a B is considered. For most community college students these requirements mean that an internship occurs no earlier than their second year. The program director screens candidates to determine their qualifications. After approval by the program director, the student is interviewed by the supervisor of the appropriate state agency. Matching students with job descriptions is emphasized, but state agencies make the final decision about a candidate's qualifications. If an intern does not perform satisfactorily, that individual may be dropped from the program after consultation with the agency, the intern, and the program director.

Once accepted by an agency, the intern participates in on-site work; the agency determines the specific assignments at the time the intern is accepted. Arrangement of work hours, field travel, and other details are the responsibility of the intern and the agency. The normal length of an internship is one semester, but an intern may repeat the experience for a second semester in the same agency or a different one.

Evaluation

An immediate supervisor in the agency evaluates each intern, maintaining a record of work attempted and completed by the intern as well as an evaluation of its quality. This record is submitted to the program director at the end of the internship, usually accompanied by an anecdotal evaluation report as well. The intern also submits an evaluation of the experience, and most interns keep a journal to record their reactions to the program.

The program director makes at least one on-site visit to assess the progress of the intern and to discuss the program with agency supervisors and others. Interns usually meet for a midterm conference with the program director to discuss their progress and to make necessary adjustments in assignments.

Considerations

Programs similar to this one are easily established with businesses or nonprofit organizations. Since many businesses already offer work/study opportunities for students in community college programs, the communication internship can easily fit into an already existing framework. Such programs can become very large or remain small; the latter is the case at Plymouth, primarily because of the concern for quality but also because of several other factors that should be kept in mind by others interested in duplicating the program. It has been found, for example, that student interns must be matched carefully with job descriptions; supervisors in the agencies are busy people and expect interns to be well-qualified, responsible individuals who perform at high levels. For this reason, it is better to leave openings unfilled than to send out interns only marginally qualified. A second consideration is the intern's schedule. Plymouth's rural location, for example, requires students to travel on their own to the agencies—usually a round trip of one hundred miles—and most interns take other courses while in the program. These circumstances mean that some students can devote only two days a week to the internship, a factor recognized by establishing variable credit up to three hours per semester. The credit is contracted for after interns and agency supervisors have determined the work loads interns are able to carry. Agencies would like students to work more days a week and attempts are being made to meet this need. At present, however, students pay for internship credits and subsidize their own travel; the latter is necessary because New Hampshire law does not allow state agencies to pay interns. The fact that students are willing to incur such expenses to obtain practical experience, however, suggests the strength of the program.

At the present time, the public communication internships are part of an independent study program within the English department, although students participating in the program come mainly from education, science, and interdisciplinary studies. The program director is a full-time teaching member of the English department who receives no compensation or released time for the administrative duties, although the department subsidizes travel for on-site visits. Because the program is small, the work load is not unreasonable, but released time in a large program would be desirable. The largest work load occurs at the time of establishing the program, which calls for a careful survey of needs within state agencies, discussions with agency heads and supervisors, publicity within and without the institution, and the screening and placement of interns.

Benefits

The program offers benefits to several groups. New Hampshire residents benefit from increased informational services from the agencies involved, and the quality of the documents and brochures they receive is improved. The agencies benefit from the program because at present almost all branches of the state government are understaffed in public relations and report-writing areas. The institution benefits because colleges, both two-year and four-year, cannot simulate the kind of practical experiences that state or business agencies offer nor can they obtain qualified instructors in the areas covered by the internships. And, finally but most important, students experience firsthand the significance of technical communication skills in professional fields.

Part Four: Developing Classroom Strategies

11 The "Business" of Communication Courses: A Simulation Approach

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Teachers in two-year colleges can unify a course in business or technical communication by simulating employer/employee relationships with their students. Students are "paid" (graded) by their teacher/employer according to the quality of their work and are evaluated on the basis of work done, attitude, effort, and personality, just as they would be on the job. In response to the simulation of realistic organizational contexts in specific assignments, students begin to act and write in a professional manner. In their roles as "employees," students learn *why* as well as *how* they communicate, and teachers are spared the annoyances of late papers and poor attendance.

A course in business or technical communication needs a sense of purpose and wholeness so that students recognize immediately the direction and intent of the course. Unfortunately, establishing clear educational objectives for this kind of course is not easy, especially for teachers in two-year colleges, where heterogeneity of classes, the students' lack of experience in their major areas, and occasionally even the teacher's unfamiliarity with an untraditional subject may lead the teacher to make the communication course a pastiche of grammar exercises, letter writing, and process descriptions. Students do not respond well to this kind of course, and teachers feel uncomfortable teaching it. What is needed is an approach to the teaching of business and technical communication that ties together the disparate elements of such a course, even if the teacher cannot determine exactly what kinds of writing students will do on the job.

I would like to describe an approach that I have used for several semesters. I feel that it unifies the business and technical communication course in such a way that individual assignments have immediate coherence to students and long-range usefulness to graduates on the job. In other words, this approach allows teachers to discuss on-the-job communications and to encourage students to perform responsibly as they participate in the course itself.

All students in my business and technical communication courses are involved in a simulation of a business situation in which I am the employer and they are employees. On the first day of class I explain that students are now in my employ and that this course is their "job." I tell them they may "moonlight" for someone else (take other courses), but that is their own affair and will not affect my expectation that they perform adequately for me. I suggest that they will be "paid" (graded) according to the quality of work they do for me, and that they will be evaluated not only on the basis of work done but on attitude, cooperation, effort, and personality as well. I tell them to treat my class in every respect as they would a job. If they are going to miss work, they must let me know; lateness will not be tolerated. All reports are due at the times indicated; all assignments must be completed; all must be typed.

Advantages

One advantage of this approach is that it replaces the parent/child relationship that often prevails in classrooms with an employer/employee metaphor. As a result, students perceive the situation and their role in it in a new light. They begin to *act*—and even to write—professionally. A second advantage is that when I simulate the organizational contexts my students face when they graduate and get jobs, I am spared almost all of the wear and tear normally associated with teaching. Because my students are *expected* to behave professionally, they do, and I concentrate on imparting information instead of coaxing reluctant performers. I rarely have trouble with absences, late papers, or moodiness because students understand that success or failure in the classroom, like success or failure on the job, is their responsibility, and not the teacher's. They also understand (some of them for the first time) just what is expected of them as jobholders. I encourage them to realize that since they will be judged subjectively by their employers, they must therefore strive to impress their superiors with their attitudes as well as to do adequate work. The course thus becomes more than just a course in writing, though it certainly requires plenty of writing; instead, it takes both its shape and meaning from the full range of verbal and nonverbal communication that occurs on the job. It gives purpose and unity to everything in the course; it helps the teacher to design appropriate, realistic assignments and it helps students to understand why they are doing these assignments. In other words, this method helps teachers to fulfill the real educational objectives of a course in business or technical communication: when students leave such a course, they know *why* they communicate as well as *how* to communicate. They are ready to participate fully in their careers because they know better how to evaluate the organizational contexts within which they work.[1]

Relationship between Student and Teacher

In some ways this approach formalizes the relationship between teacher and student, creating distance between "employer" and "employee." In other, more important, ways, however, it brings teacher and student together in a common cause. When the situation has been placed before students, and the ground rules well established, the demands of the "job" become a driving force. Students begin to see assignments as tasks to be accomplished in a businesslike manner because they see the need to acquire the skills involved in the assignments. In the process, students tend to think of the instructor as a participant in the struggle rather than a judge of it. After all, we all work for the same company. In turn, I shift my stance a bit to become a kind of consultant in matters of communication, and students come to me for advice about how to solve "our" problems. Thus the "business" approach does not inhibit relationships with students; on the contrary, it seems to give us more common ground for discussion.

Of course this approach does not simply involve taking a firm stand on when papers are due; it involves motivating students to *want* to fulfill their roles as "employees." When the reasons for the simulation are clear, almost no one refuses to participate. Even previously marginal writers often become quite competent when they see why communication skills are important to their careers. As a result, the assignments I make are received as opportunities for advancement rather than obstacles to it.

Assignments

Although various assignments can be made, the "business" approach affects them all. One can, for instance, require students to apply for jobs with the "company" by writing resumes and letters of application and by arranging mock job interviews. One might also include in the course a series of case studies involving the business dealings of a real or imagined company.

One of the assignments in my course is a team project designed to help students learn firsthand about organizational communication. I assign technical communication subjects to teams of four "employees" and tell them the final result I expect (a written report, an oral report, and a visual presentation). I announce a due date and tell my "employees" that they must now function independently and professionally to organize and produce the required result for our "company." I offer assistance when it is requested, but I encourage these teams to learn about scheduling, budgeting, deadline pressures, and coordination of efforts on their own. Throughout, I emphasize that employees must depend on each other to survive on the job. Other instructors may not choose to go to these extremes, but the method works with almost any assignment, so long as the analogy to business situations is maintained and students are allowed to write about matters directly related to the scientific, technical, and business fields they will enter.

Application to Two-Year Colleges

This approach to communication courses works particularly well in two-year colleges, where some students are just out of high school and unfamiliar with the situations they will face on the job and others are returning to school from the working world where they have been treated as responsible employees. The "business" approach appeals to the latter group of students without condescending to the former. In addition, older students can contribute much from their working experiences, thereby helping to enlighten both students and teacher about the way things work "out there." This kind of participation gives members of the class a shared sense of purpose—a valuable commodity for students who are unsure of their skills and who need the support of a sympathetic peer group, and a tremendous aid to the teacher trying to make the communication course a profitable educational experience. Students from diverse backgrounds and with diverse majors thus become a positive attribute of the course rather than a burden to the teacher, and students in such a class broaden their knowledge of the business and industrial world much more quickly than they would in a homogeneous class.

The Teacher's Stance

A final word of advice: instructors who use this approach must be prepared to be firm with students, to say "no" to some of their requests for time extensions or acceptance of late papers. In the business world, deadlines must be met. Instructors using this approach must, however, also be fair and flexible in applying the rules they set up to govern the class. All ground rules must be laid out carefully in advance so students are not surprised by unexpected decisions on the teacher's part. Any arbitrariness employed by the instructor must be explained within the context of the business metaphor. And most important, teachers employing this method must not be governed by the simulation to the extent that they temporarily lose their pedagogical purposes in the role they play. The approach is valid only as long as it facilitates learning.

The key to the success of this teaching method is the same as for any other. The attitude the teacher takes toward a specific teaching situation and the ability the teacher has to use his or her professional skills to further the professional communication skills of students determine the success or failure of the "business" approach.

Notes

1. This approach to business and technical communication does not, of course, take the place of courses in business management that most students ought to take. A course in communication, however, is as close as most students get to formal training in these areas. The communication course provides most of them with their only exposure to these elements of the working world and, therefore, can do much to further their management skills.

12 Writing on the Job: Communication as Design

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On the job, the careful writer designs a response for each communication situation, realizing that no two situations are quite alike. Too often, however, teachers and textbooks focus on *types* (writing as imitation) rather than *process* (writing as design). To teach writing as process, we must take a close look at what happens during the planning phase of the writing task, a phase that involves three components: (1) determining purpose in both a cognitive and an affective sense, (2) developing content, and (3) devising an appropriate strategy. Two-year college students who can handle these three components are ready to face any writing task that may arise on the job.

Teachers of technical and business writing are taking a hard look at what happens on the job when someone is told to "put it in writing." What they are finding is that almost every writing task is unique; almost every writing task, however small, imposes its own set of demands on the writer. Yet many textbooks suggest that a writer need master only a few simple models to meet all but the most complex writing tasks. Would that it were so. Unfortunately, the standard letter of adjustment, laboratory report, or routine request of the traditional textbook doesn't always answer. What is needed is an approach that emphasizes *process* (writing as design) instead of *types* (writing as imitation).

On the job, it seems, the successful writer approaches a writing task much as an engineer might approach a design problem. Working toward a clearly defined purpose, the writer labors within certain limitations to produce a response that meets the demands of the task as effectively as possible. The writing classroom, therefore, should help students develop flexibility in their approaches to writing problems. To do otherwise, to create the impression that an acquaintance with seven or eight (or even twenty or thirty) types of letters and reports prepares them for writing in the world of work, is to function just this side of malpractice. Such a practice is no more valid than to lead engineers to believe that a solution to any design problem can be found in a reference file of twenty or thirty production drawings.

What this discussion seems to suggest is that more classroom time must be spent on the planning phase of writing. Planning is the process by which a writer generates an adequate and effective response to a communication problem. It is a process that can be taught systematically. That is, a structured procedure can be devised to lead students through the planning process and into the writing phase, a procedure that will prove as useful on the job as in the classroom. Before such a procedure can be developed, however, the elements of the planning process must be clearly differentiated from elements that belong, more appropriately, to the writing phase.

As I see it, the planning process involves three major areas in which certain key decisions must be made—purpose, content, and strategy (or organization). There is, of course, considerable overlap among the three, but writers who give sufficient time and thought to purpose, content, and strategy are able to plunge into the writing phase with confidence and a sense of the form the final product will take.

Purpose

Perhaps a writer's most important planning task is to identify the purpose of the written communication. Assignments in a process-oriented writing class, therefore, should not be categorized in units or chapters identified with such labels as "requests," "responses," "reports." Instead, assignments should be presented as they would occur on the job. It is unlikely that a supervisor in an aerospace plant would ask a technician to "write a letter of response to Ms. Regina Turner's request for the result of the stress analysis tests on the X-104 airfoil." Rather, the supervisor would probably say something like this: "Ms. Turner in Systems Engineering needs the stress analysis readings on the X-104 airfoil. Write them up for her and make a copy for me." It is left to the writer to realize that what is called for here is a simple letter of response.

Now, that all seems pretty obvious; however, the purpose of a piece of writing is not always so readily apparent. Consider, for instance, a letter written to explain why a batch of electronic components had an excessively high failure rate. Is the purpose of that letter merely to explain? Or is it to retain the good will (and potential business) of a customer? It is, of course, both; and the writer who realizes that is in a position to design a more effective letter than the writer who simply recalls the content of an index card labeled "letter of explanation."

Purpose, then, has both a cognitive component and an affective component, and both influence nearly everything else the writer does. Tone, strategy, even format, all derive from one or the other of these two components.

Consider the cognitive component for a moment. A writing task may *seem* merely to require the transmittal of routine information, for example, the results of a stress analysis test. The true cognitive purpose, however, may be to persuade, to sell. Failing to realize that, the writer will make a poor choice of format. Test data are usually best conveyed in a table or similar graphic display with, perhaps, a memo or brief letter of transmittal. That format lacks persuasive punch, however. A letter would probably be a much more effective sales device. Similarly, the choice of strategy depends heavily on cognitive purpose; a letter to persuade might be organized in one manner, a letter transmitting information in quite another.

The affective purpose of a piece of writing determines its tone. It involves such decisions as whether to ask or demand, whether to soft-sell, and what sort of image to project. The choices made, of course, depend on the writer's relationship to the intended reader, and when one defines the affective purpose of a piece of writing, one must analyze that relationship carefully. A letter requesting information of a close personal friend will (and should) be a lot breezier than a letter of request written to someone the writer has never met. In the same way, an engineering consulting firm might wish to project an image with a tone quite different from that used by an urban savings and loan association.

Assignments in process-oriented writing classes must, therefore, be given within the context of fully imagined communication situations. That is, student writers must know—at a bare minimum—to whom they are writing, their relationship to that person, whom they represent when they write, and the image that company or person wishes to project. (See the letter-writing assignment at the end of this article.) Further, these context stipulations should be altered frequently so that students develop the flexibility that on-the-job writing requires.

In an ideal class—one in which students are highly motivated and need little or no help with the basics of grammar and sentence structure—I'd spend at least three weeks, perhaps longer, analyzing communication situations to determine all aspects of purpose in each. However, there are other matters—such as content—to be considered before pen is put to paper.

Content

Determining content is a matter of deciding what should be put into and what should be left out of a piece of writing. In the case of a simple transmittal of information, the content is obvious—the information. In more complex cases, however, students should learn to take time to think about what *might* be included. At this stage, brainstorming with pencil and paper is useful. Students should jot down whatever might become part of the final product, no matter how unlikely that possibility seems at this stage.

Just how much of what has been jotted down is retained depends, of course, on what is needed to fulfill all aspects of the purpose. The cognitive component of the purpose determines the basic content of the communication. The affective component determines what, if anything, is included *in addition to* the basic content. A letter designed primarily to transmit information but intended also to convey a warm interest in the reader's corporation must demonstrate that interest—a couple of questions about the business, a helpful suggestion, a few sentences of congratulations on an accomplishment, best wishes for a planned venture. (Here you can see why brainstorming plays an important role in the planning process of good writers.)

Strategy

When the content has been decided, the writer must determine how best to order that content. In other words, an effective strategy is chosen. In this area, too, teachers of technical and business writing have traditionally prescribed standard strategies for various types of communication. A letter of request, for instance, should begin with the request and then provide justification. A routine response should provide the response and then stop. On the job, however, strategies are not so simple.

An effective strategy depends again on the purpose of the communication. If the affective purpose is to convey a relaxed, informal image, the writer wouldn't begin with a formal request, supply the justification, and then close—just like that. A letter designed to convey friendly concern can afford a few personal sentences before laying out a statistical table or asking for a cost estimate. And a hard-sell letter will differ significantly from one that soft-pedals its message. Although anyone who has pushed a writing assignment this far through the planning phase should have a pretty good idea of the sort of tone that is required, that tone itself takes shape only as part of the writing process. One cannot, for instance, simply determine that a warm, casual tone is needed and then proceed to produce one. The attempt to achieve that (or any other) tone may require many drafts—the technical and business writer's equivalent to the poet's search for the right "voice," perhaps.

At this point, too, the writer should give thought to the visual possibilities of written communication. Is certain information more effective in graphic form? Can data be highlighted by indentation or underlining? Obviously, the answers to these questions hinge upon earlier decisions concerning purpose and content.

Sample Assignment

I maintain a file of assignments for each major field of study served by the technical writing course I teach. The following example is drawn from my assignment folder for students in the business management and secretarial science programs. Students in other fields are assigned a similar writing task with different subject matter.

> *Communication Situation*
>
> The Virginia Electric Power Co. (Vepco) is about to construct a new auxiliary power plant on the north shore of the Rappahannock River near the town of Farnham. Although you currently live in another part of the state, you are being transferred to Farnham as manager of the new facility. Your new district supervisor suggests that you write to some of the community leaders in the Farnham area to introduce yourself and tell them about the new plant. You decide to tackle the most difficult letter first.
>
> James R. (Buddy) Robinson is chairman of the Farnham Area Environmental Protection Committee. He is also the owner of a retail sporting goods store. Mr. Robinson and his group fought hard to prevent Vepco from building the new plant, and he is certainly not going to be delighted to hear from you. Write to Mr. Robinson and see if you can pave the way for a cooperative relationship.
>
> Here are some "facts" you can use: the new plant will contribute to the economic expansion of the community by providing more jobs and greater spending power for area residents; materials dumped into the river will fall far below the standard established as "safe" by the Environmental Protection Agency (EPA); Vepco is pledged to retain the scenic beauty of the area insofar as possible. Finally, Vepco's recent advertising campaign revolved around the slogan "Serving the People of Virginia."

Planning Notes

Use this three-point outline to develop ideas for your letter to Mr. Robinson. (I have included responses to the planning outline that I would find acceptable; this information, of course, does not appear on the assignment sheet distributed to students.)

1. Purpose
    a. Primary (To convince Mr. Robinson that Vepco—and I—share his concern for the environment and will do everything possible to keep from damaging the river and the area around the new plant.)
    b. Secondary (To introduce myself; to tell Mr. Robinson that construction will begin on March 1 and that the building will be completed some time before the following winter.)
2. Content (Here the student jots down everything that might be included in the final letter. The list would probably begin with the "facts" provided in the assignment and go on to include whatever other information the writer came up with—information about himself or herself, observations about Vepco's track record on environmental issues, comments about how much the writer is looking forward to moving to Farnham.)
3. Strategy
    a. Tone (Friendly, conveying a sincere interest in the area and a desire to be part of the community.)
    b. Organization (Open, with emphasis on something positive about the new plant, perhaps "To serve the residents of Farnham" or "To meet the growing energy demands of the Farnham area." Body of the letter can note specific steps being taken to protect the environment and point out economic benefits to the area. Close on a personal note—use Mr. Robinson's name. Emphasize looking forward to becoming part of the community—mention interest in fishing.)

In a subsequent assignment I ask students to complete the same task but this time as someone who has been a resident of the community for several years and is being appointed plant manager, not transferred in. Consequently, the letter will be going to a longtime acquaintance (although not necessarily a close personal friend). All elements of the plan must now be adjusted accordingly.

Conclusion

Teaching writing as process is a complicated and frustrating business, not nearly as pedagogically manageable as the teaching of types.

Teachers who emphasize the process of writing cannot always pull answers out of their hats (or their instructor's manuals). They must spend more time wrestling with such nebulous concepts as tone and image, and they must be prepared to offer a variety of complex and fully developed writing assignments to their students while providing only general guidelines on how to attack those assignments. In the end, though, such teachers may finally silence that old whisper on the student grapevine: "Don't worry about what they tell you in class; no one does it that way on the job."

13 Using Toulmin Logic in Business and Technical Writing Classes

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Toulmin logic provides a straightforward, easy-to-apply technique that students in business and technical writing can use to evaluate the validity of their arguments and to determine how much and what kind of additional information is needed to support their points. Toulmin logic will help students at any level, but its simplicity, completeness, and heuristic power make it especially valuable for courses in business and technical writing in two-year programs, where students have not had the opportunity to study formal logic. Toulmin's model of evidence, warrant, and claim enables instructors to tell students precisely what kind of statements they need to add to make their arguments convincing. Thinking in terms of the full Toulmin model forces students to consider the reader's probable responses and helps them write letters, memos, and reports that are reader-centered, not writer-centered. Toulmin logic can help business and technical writing students in two-year programs think more logically, write more cogently, and better adapt their arguments to anticipate questions or objections which the reader might have.

Basic courses in business and technical writing rarely include units in logic.[1] This is especially true of courses in two-year programs, where there is so much to teach and so little time in which to teach it. Yet inadequate or faulty logic is a common weakness in student papers, resulting not only in incoherent paragraphs and unproved recommendations, but also in inadequately developed reader benefits, apparently arbitrary warnings in instructions, and unconvincing sales, fund-raising, and job application letters.

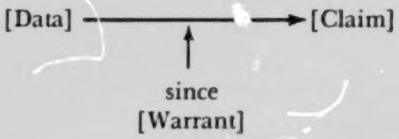
Most instructors attack these problems on a case-by-case basis. Merely writing "faulty logic" or "Develop!" or "Why?" in the margin, however, is of limited help to students. If students are to avoid such errors in future papers, they need a straightforward, easy-to-apply technique to evaluate the validity of their arguments and to determine how much and what kind of additional information is needed to support their points. Toulmin logic is an effective tool to help students make these decisions.

Stephen Toulmin made several contributions to the study of argument in *The Uses of Argument* (Cambridge: Cambridge University Press, 1958), but the one which is most directly applicable to business and technical writing, and the one which nonlogicians call "Toulmin logic," is his formula for the structure of arguments. The advantages of Toulmin's model and terminology were perceived almost immediately by teachers of speech,[2] and more recently by teachers of composition.[3] The simplicity, completeness, and heuristic power of Toulmin logic make it especially valuable for courses in business and technical writing. Toulmin logic can be taught quickly: the basics can be taught in as few as twenty minutes. It requires no training in inductive or deductive logic, making it especially appropriate for two-year programs where students are unlikely to have had such training in previous classes. And while instructors can use Toulmin logic to show students why the logic of a paragraph is faulty or inadequate, the particular strength of Toulmin logic is the ease with which students can use it as a heuristic to check their own rough drafts without the instructor's help.

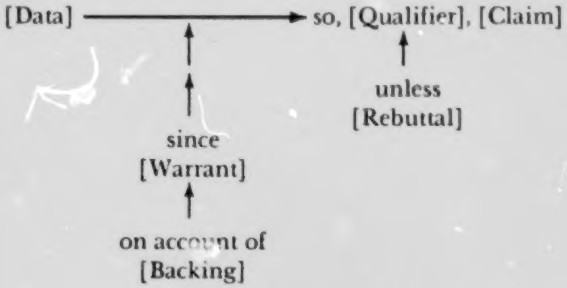
The Toulmin Model

Toulmin explains his model using the steps that we go through in everyday conversation when we try to convince someone of something (*The Uses of Argument*, 97–107).

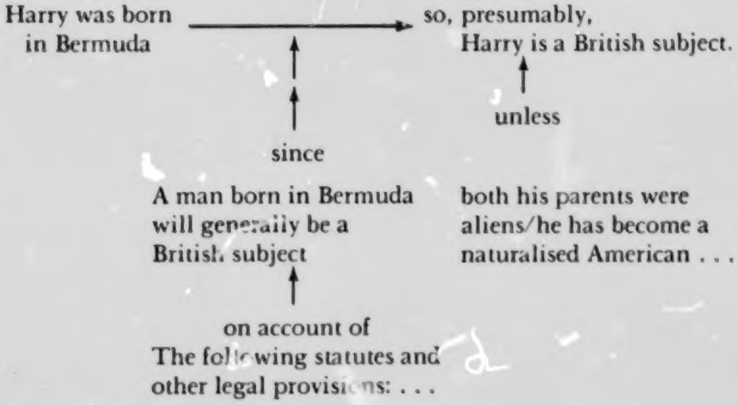
In everyday life, the first part of the argument to emerge is frequently the assertion, or *claim*, that we wish to make. If this claim is challenged, we must support it with facts, evidence, or *data* that our audience accepts. On occasion, the audience may not see what bearing the data have on the claim. If this is the case, merely adducing more data will not help. Instead, we must explain the general principle, or *warrant*, which authorizes the step between the data and the claim. Presented schematically, the argument so far looks like this:



The argument may still be unconvincing. We may need to assure our audience that some counterargument, or *rebuttal,* does not negate the claim; we may have to admit that our claim is only "probably" and not "necessarily" true and thus *qualify* it. Finally, we may be forced to defend the legitimacy of the warrant by citing its authority, or *backing*. When all these elements are incorporated, the complete argument looks like this:


[Data]
so, [Qualifier], [Claim]
unless
[Rebuttal]
since
[Warrant]
on account of
[Backing]

Toulmin illustrates his model with the following example:


Harry was born
in Bermuda
so, presumably,
Harry is a British subject.
unless
both his parents were
aliens/he has become a
naturalised American . . .
since
A man born in Bermuda
will generally be a
British subject
on account of
The following statutes and
other legal provisions: . . .

Using Toulmin Logic to Mark Student Papers

The terminology of Toulmin logic enables instructors to tell students precisely what kind of statements they need to add to make their arguments convincing. While the logic in each of the following paragraphs is inadequate, the solutions one would recommend differ from case to case. Toulmin logic provides a simple way to deal with each problem.

1. The shell casting process offers many advantages over other molding processes. Some of these advantages are lower cost, excellent surface finish, and closer dimensional tolerance.	*Data are necessary to support the claims.*
2. The students I surveyed were split 50/50. Students on this campus don't agree on whether or not cars should be prohibited from campus streets.	*If the datum is to support the claim, an explicit warrant is essential: "The students I surveyed were a representative sample of the students on this campus."*
3. *Clostridium botulinum* occurs in almost all soils throughout the world. All foods come in contact with soil, either directly, or indirectly through the agency of airborne dust. We must then conclude that all meat products have a high incidence of being contaminated with spores of *Clostridium botulinum.*	*To be convincing, this argument must be expanded to include two rebuttals: that the spores are not filtered out in (a) the animal's lungs, or (b) in its digestive tract, but instead infect the muscles and therefore the meat.*
4. Our national advertising campaign stresses our "no-fault" auto insurance and our hold-the-line-on-costs policies for life insurance. This ad campaign will give our agents the necessary edge over competitors to sell prospective customers on our insurance.	*Such a claim cannot be made with full certainty: too many other variables affect sales. Qualify the claim.*
5. XYZ University will never have a good football team because its academic standards are too high.	*The warrant ("Good football players can't meet high academic standards") isn't explicit, but even adding it won't be enough to convince the reader. Whether this argument is valid depends on which of two possible backings is used. "Good football players are stupid" is patently false; "After practicing four hours a day, football players are too tired/have too little time to complete complex and lengthy assignments" may be true.*

Toulmin Logic as a Heuristic

Toulmin logic functions as a heuristic in the narrow sense of the term by providing a step-by-step method for testing arguments. It is also important as a heuristic in the larger sense, encouraging students to discover more about their subjects by investigating them more thoroughly. As students identify the warrants for claims and then search out the backings for those warrants, they are led deeper and deeper into their subjects. How do we know *X*? What authorizes us to say *Y*? Answering such questions may help students see how much of our "knowledge" is based on shared assumptions for which there may in fact be limited proof.

In freshman composition courses, writing has long been recognized as a discovery process of learning about oneself. Following the Toulmin model helps students see that business and technical writing can be a discovery process of learning about the external world.

Finally, the Toulmin model suggests that the composing process in business and technical writing is not a mechanical search for buffer, reason, refusal, and resale, or for nine methods of expanding a definition, but is instead as organic a process as any other kind of writing.

Toulmin Logic and Audience Analysis

While Toulmin logic is a heuristic that can help students generate ideas and go into arguments more deeply, it does not in itself tell students how many of these ideas must be included in the final paper, or how they may be best arranged. The answers to these questions, like those to so many of the questions business and technical writers must ask, depend on the reader and the situation—on audience analysis and adaptation.

The following guidelines can help students decide whether a given part of the model should be included.

1. Whatever the argument, students should make both the claim and the data explicit. Minor claims with obvious data can be presented in complex sentences, the data in the subordinate clause, to avoid giving the impression that this information is new and surprising.
2. The warrant should be included if it is new information to the reader, if the reader may have heard the warrant but forgotten it,

if the reader may disagree with the warrant, or if invalid as well as valid warrants exist.

3. The backing must be made explicit if the reader will disagree with the warrant, if specious backings exist, or if there are arbitrary demands for documentation (e.g., as in a term paper).
4. Rebuttals to the main claim should always be countered. Indeed, failure to dispose of counterarguments is, after failure to provide a valid warrant, probably the most common cause of unproved recommendations.
5. Qualifiers must be used whenever the truth of the claim is uncertain or relative. The need for qualifiers is widely recognized in technical writing. Recent rulings on truth-in-advertising, as well as the growing sophistication of many readers, suggest that appropriate qualifiers can also increase credibility in business writing. "Probably" and "may be" are not the only possible qualifiers. Subjunctive verbs, explicit disclaimers, and other limiting statements can also serve ("This procedure should produce . . ."; "$p \leq .05$"; "Scientists estimate that . . ."; "This change will enable us to save . . ."; "The most promising short-term solution . . .").

Students usually realize that the main claim, their thesis or recommendation, must be formally established. However, they frequently omit warrants, rebuttals, and qualifiers for secondary and tertiary claims. Secondary and tertiary claims, however, in turn become data or warrants for primary claims. If the reader has to stop to ask "Why?" or says, "That's not true: I know of an exception," the reader is likely to find the argument confusing or unconvincing. Thinking in terms of the full Toulmin model forces students to consider the reader's probable responses and helps them to write letters, memos, and reports that are reader-centered, not writer-centered.

The schematic diagram of Toulmin logic enables students to see that some of the common patterns of organization are merely specific reorderings of the parts of an argument. One may start with the warrant, if it is a generally accepted scientific principle, in a movement from simple to complex or known to unknown. The common ground one establishes with the reader at the beginning of a persuasive memo may be either a warrant or its backing. Data are presented first in inductive patterns of organization; opening with the claim is presenting one's thesis first. Even the rebuttal may be presented first: indeed, definition by negation is simply answering a possible counterclaim. Which pattern of organization is best depends upon the reader, the situation, and the claim.

Conclusion

In a far shorter time than it takes to discuss deduction and induction, instructors can explain the basics of Toulmin logic. Once the basic formula has been introduced, students and instructor have a common vocabulary for evaluating arguments and recommending remedies for faulty or inadequate logic. Toulmin logic can help business and technical writing students in two-year programs think more logically, write more cogently, and better adapt their arguments to anticipate questions or objections which the reader might have.

Suggestions for Further Reading

Several recent texts explain the application of Toulmin logic to persuasion and provide excellent examples. While none of them applies the Toulmin model directly to the problems of business and technical writing, instructors may still find these books useful to increase their own understanding of Toulmin logic.

Ehninger, Douglas. *Influence, Belief, and Argument.* Glenview, Ill.: Scott, Foresman, 1974.

Ehninger, Douglas, and Wayne Brockriede. *Decision by Debate.* 2d ed. New York: Harper & Row, 1978.

Hairston, Maxine. *A Contemporary Rhetoric.* 2d ed. Boston: Houghton Mifflin, 1978.

Hairston, Maxine. *Successful Writing.* New York: W. W. Norton, 1981.

Miller, Gerald. *Perspectives on Argumentation.* Glenview, Ill.: Scott, Foresman, 1966.

Mudd, Charles S., and Malcolm O. Sillars. *Speech: Content and Communication.* 3d ed. New York: Thomas Y. Crowell, 1975.

Rieke, Richard D., and Malcolm O. Sillars. *Argumentation and the Decision-Making Process.* New York: John Wiley & Sons, 1975.

Toulmin, Stephen, Richard Rieke, and Allan Janik. *An Introduction to Reasoning.* New York: Macmillan, 1979.

Notes

1. The subject matter suggested by William J. Lord et al. of the American Business Communication Association does include "applied logic"; see "Standards for Business Communication Courses," in *The Teaching of Business Communication,* ed. George H. Douglas (Champaign, Ill.: American Business Communication Association, 1978), 28. However none of the published descriptions of course syllabi includes logic as a separate unit. For a representative sampling, see the following articles: Ann A. Laster and Nell Ann Pickett, "Technical Writing as an Approach in Freshman Composition at Hinds Junior College," in *The Teaching of Technical Writing,* ed.

Donald H. Cunningham and Herman A. Estrin (Urbana, Ill.: National Council of Teachers of English, 1975), 83-85; Roy A. McGalliard, "The Function and Content of Technical Writing in the Two-Year College," *The Technical Writing Teacher* 5 (1978): 59-63; Karl M. Murphy, "The Basic Technical and Business Writing Course at Georgia Tech," in *The Teaching of Business Communication*, 42-46; Richard D. Rowell, "Survey of the Basic Business Communication Course in Michigan Post-Secondary Schools," *The ABCA Bulletin* 41 (1978): 18-19; Katie Avery White, "The Business Communication Course at North Carolina A&T State University. *The ABCA Bulletin* 42 (1979): 21-22; University of Illinois' "General Outline and Schedule of Assignments: Business and Administrative Communication," in *The Teaching of Business Communication*, 34-36.

2. Wayne Brockriede and Douglas Ehninger, "Toulmin on Argument: An Interpretation and Application," *Quarterly Journal of Speech* 46 (1960): 44-53.

3. Charles W. Kneupper, "Teaching Argument: An Introduction to the Toulmin Model," *College Composition and Communication* 29 (1978): 237-41; Michael L. Keene, "Teaching Toulmin Logic in the Writing Class," *Teaching English in the Two-Year College* 5 (1979): 193-98; Maxine Hairston, *Successful Writing* (New York: W. W. Norton, 1981), Chapter Four.

14 Zen and the Art of Business Letter Writing: Teaching "Bad-News" Strategies

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The teaching of "bad-news" organizational patterns may be accomplished through an inductive approach derived from Robert Pirsig's description of a similar methodology in *Zen and the Art of Motorcycle Maintenance.* Students examine sample letters and evaluate the strategies used in each. They discover that writing is not, as they previously thought, an inherited skill but one that can be learned. Since the letters derive from actual situations, students come to realize that the organizational patterns taught in business communication classes emerge not from textbooks but from on-the-job experiences.

The persona in Robert Pirsig's *Zen and the Art of Motorcycle Maintenance* describes an effective strategy for teaching writing to freshman composition students:

> To reinforce the idea that they already knew what Quality was he [the instructor] developed a routine in which he read four student papers in class and had everyone rank them in estimated order of Quality on a slip of paper. He did the same himself. He collected the slips, tallied them on the blackboard and averaged the rankings for an overall class opinion. Then he would reveal his own rankings, and this would almost always be close to, if not identical with the class average. Where there were differences it was usually because two papers were close in quality.[1]

Pirsig's persona uses this exercise to allay the students' fear of writing by demonstrating that "quality writing" can be recognized, if not defined. The purpose of his composition class, then, becomes one of defining and determining the strategies that lead to "quality writing."

A modified version of Pirsig's approach proves helpful for many two-year college students. Following years of having been told to "improve," "work on," "put time into," and "correct" their writing deficiencies, these students have become convinced not only that they cannot write but also that the writing process itself involves no logical structure. In essence, they believe writing is a born, not a learned, skill. Pirsig's strategy allows an instructor to demonstrate that these assumptions are invalid, that writing is a logical, learnable skill. Furthermore, the use of Pirsig's strategy allows students to discover for themselves the existence of certain structural patterns for writing, a discovery that, I find, carries into and influences the writing styles of all the students in the class.

Application

Pirsig's approach is applicable to many situations in a business communication class, but one of my favorite applications is the "bad-news letter." In essence, the lesson usually goes as follows.

The unit on the "bad-news" letter begins with students receiving four versions of the same letter. The differences between the letters are pronounced. The following four letters are examples I have used.

Letter A

Dear Mr. Jones:

We're sorry but the stated dates of conception are outside the stated parameters of your policy. Therefore we cannot cover your hospital expenses.

We do, however, urge you to examine our Child Care Protection Plan for your new child.

Letter B

Dear Orange Kraus Policy Holder:

We cannot pay your recent claim for one or more of the following reasons:

1. Our company does not presently cover said dependent.
2. Orange Kraus began covering said dependent after the discovery of the stated illness (or other such malady).
3. Orange Kraus's policy does not cover the stated problem.
4. Other insurance policies will cover the hospitalization costs.

If the information above does not clear up your questions, please let us know.

Letter C

Dear Mr. Jones:

Your request for payment for the hospitalization expenses of your wife and new daughter arrived yesterday. I am happy to see your family is in good health.

In checking the hospital report with our records, I noticed that your child was born on July 7 and that your policy became effective on March 15 of the same year. This four-month interval means conception occurred before the policy was taken out. This pre-policy conception date means that hospitalization costs cannot be covered. Your new daughter is, fortunately, still eligible for our new Child-Care Protection package.

The Child-Care Protection Plan guarantees the insurability of your daughter for the first 30 years of her life, a guarantee that means added financial protection for you and your family. Furthermore, to protect her from inflation, this plan calls for "frozen rates" on any Orange Kraus policy she later elects to take out. The Child-Care Protection package is only available to Orange Kraus policy holders with children two years of age or younger.

You can get a more detailed explanation of the Child-Care plan by reading the special brochure I have enclosed for you. Please let me know your decision to join the program as soon as possible.

Letter D

Dear Mr. Jones:

Your request for reimbursement for your wife's and child's hospital stay has been processed and rejected. As you undoubtedly know, at the time of conception your wife was not covered by our policy. For this reason Orange Kraus has no legal obligation to pay for your family's hospital expenses.

We assume this was a mistake and are happy to inform you that your present coverage protects you from such future errors. As further protection from other problems, we urge you to consider our Child-Care Protection Plan. This program protects your family from disastrous hospital expenses in the event your child becomes seriously ill. One can never be too safe, Mr. Jones.

Again, we're sorry we cannot reimburse you for your family's hospitalization, but we look forward to providing you with years of friendly protection.

I ask students to rate these four letters from best to worst according to two standards: (1) clarity and (2) receptiveness, that is, the letter they would most like to receive. Inevitably, students select letter B as the clearest, with letters D, C, and A usually following. The order for the letter they would most like to receive, however, differs markedly from the clarity ranking. Approximately 90 percent of the students in every class choose letter C as having the most "receptivity," with letters D, B, and A usually following.

After the class arrives at a general consensus of the clarity and receptivity ratings, I ask students to speculate about the significance of the findings. On occasion I make this an out-of-class assignment, for example, a memo evaluating and analyzing the strategies used in each letter. Through this evaluation process students come to recognize that in certain situations clarity must be made subordinate to diplomacy. At the same time, by analyzing letter C and by comparing it with the other letters, students begin to perceive some of the important structural features of the "bad-news" letter. For instance, a thoughtful examination of letter C helps students determine the organizational pattern of this kind of letter—buffer, reasons leading to refusal, refusal, pleasant ending.

More perceptive students note other less obvious but equally significant strategies in the letters. Someone, for example, usually notes that while letters A, B, and D are written almost totally in the active voice (with the exception of the opening sentences in letter D), letter C shifts between the active and passive voice, with the "bad news" led up to and delivered in passive sentences.

Other students often note that the writer of letter C, in an effort to keep the refusal from appearing at the end of the second paragraph—a position that is highly readable—alters the traditional rule that a paragraph should be limited to one idea and begins the third paragraph at the end of paragraph two. This notion of embedding is, of course, an important "bad-news" strategy. The instructor who wishes to emphasize this strategy further can ask students to combine the last two sentences in paragraph two. The product of this exercise is usually something like this:

> This pre-policy conception date means that, although hospitalization costs cannot be covered, your new daughter is still eligible for our child-care protection package.

Advantages

Pirsig's approach can, of course, be used with many other types of business writing. No matter how it is used, however, it allows the instructor to demonstrate that writing involves logic and reason—that it is a learnable skill. Students who long ago vowed they would never read another textbook on writing suddenly discover that writing involves logical principles—a discovery developing from the realization that principles of organization emerge not from textbook rules but from the demands of the situation, from the writer's need to adapt writing to the reader.

A second advantage is that Pirsig's approach allows students to recognize and adapt skills they already have to the writing process. Since students easily recognize that they have already acquired and perfected the adaptive skills mentioned above--i.e., they structure their conversations differently at home and at work; they do not use the same language in the classroom that they use in the local disco—they can easily be convinced that one facet of writing is simply a matter of adapting certain formal oral skills to a written context. This lesson is especially helpful to the working students common in two-year colleges; these students often have perfected their formal oral skills but are afraid or unaware of the need to adapt these skills to a written context.

Finally, a tangential advantage. By using Pirsig's approach with material written in a business context, the instructor gains one of the most important advantages available in a specialized writing class: validity. The businesslike material indicates that the course deals with the world of business instead of the world of "Why I came to XYZ Junior College." This type of content helps students acquire a new perspective on the writing process, a perspective that convinces them that writing is important not only in the academic but also in the working world.

Notes

1. Robert M. Pirsig, *Zen and the Art of Motorcycle Maintenance: An Inquiry into Values* (New York: William Morrow, 1974), 207.

15 An Alternative: The Student Journal

Ron Dulek
University of Alabama

Annette Shel
Georgetown University

Using the student journal in the business and technical communication class is based on the premise that students learn to write by writing and by evaluating their own writing and that of others. Students complete a minimum of two assigned letters a week in their journals. The content of these letters coordinates with in-class discussions and lectures. Instructors grade selected assignments from the journal (students do not know in advance which assignments will be graded), and the remaining assignments are used for peer-evaluation exercises. The student journal enables instructors to keep grading duties at a manageable level and, at the same time, provides students with many opportunities to practice appropriate writing strategies.

Thanks to a revived community and industrial awareness of the importance of specialized writing courses—along with budget cuts, proration, and various other administrative and political responses to the "taxpayer's revolt"—business and technical communication teachers at medium- and large-sized colleges and universities are confronting a malaise to which faculty at two-year colleges have long been exposed: the student crunch. Its main symptom is the presence of an overwhelming number of students in undergraduate writing classes. A dreadful side effect is the paper plague: a plethora of letters, memos, and reports that need diagnosis and surgical repair.

The instructor attempting to survive the plague has four apparent options:

1. Reduce the number of assignments.
2. Keep the same number of assignments but hire outside help to grade them.

3. Conveniently lose a few sets of papers.
4. Grade all the assignments and abandon all hope of living a normal life.

Since each of these options has obvious personal, professional, and/or financial pitfalls, we sought a fifth alternative—one that would relieve some of the grading pressures and, at the same time provide a pedagogically defensible way to teach students to write. The alternative we have developed is a student assignment book that we refer to as a student journal. In this journal students systematically practice the skills learned in the classroom. We have successfully used the journal in a sophomore-level business writing course (letters and memoranda) and are convinced that, with a few alterations, it can be adapted to other kinds of specialized junior college writing classes, including business and technical reports.

Rationale

We selected the journal first of all because we believe that students learn to write by writing; instructors can lecture about everything from communication theory to dangling and misplaced modifiers until their chalk turns to dust, but pedagogical pronouncements have little or no effect until students have an opportunity to apply this information practically. Though practice obviously does not make perfect, we're convinced that—with appropriate feedback—the more writing the better.

Second, we believe that by evaluating the writing of others, students improve their own writing skills. Harbored in the "heart-of-hearts" of many writing instructors is the secret truth they long ago recognized and hid away: the realization that their own writing improved dramatically after they began evaluating other people's writing. This improvement is, of course, logical; after someone learns to critique another's writing, that person will naturally carry over and apply these critiquing skills to his or her own writing. The journal, with its abundance in this case of sample letters, provides a ready source of material for peer evaluation. As students practice evaluating the writing of others, their own writing skills improve.

Evaluation by peers also increases the writer's awareness of readership and develops a sense of audience. When students subject their writing to multiple evaluations, they often receive different and sometimes contradictory advice. Though this experience is frustrating, it helps students realize that conflicting advice is not simply a matter of right versus wrong but rather a reflection of the differing predispositions of readers. This discovery, which underscores for students the need to adapt to their audience from as many dimensions and perspectives as possible, teaches junior college students a skill professional business and technical writers use frequently.

Procedure

Committed then to quantity as well as quality writing—yet realistic enough to recognize our own time limitations—we designed a student journal in which the instructor selectively grades student letters. Further, we dovetailed in the notion of peer evaluation as a learning exercise for the evaluator and as a means of providing feedback for the writer.

The rules for the journal are simple:

1. At the beginning of each week, students are assigned two letters to write in their journals. These assignments are geared specifically to materials covered in class or in assigned reading. The two letters must be completed by the end of the week.
2. Throughout the semester students keep the journal up to date and bring it to class every day. During workshop sessions in class, students conduct peer evaluations on selected assignments.
3. At four preestablished dates in the semester, the instructor collects one journal assignment to be graded. Students have no prior knowledge which assignment will be selected. If the instructor prefers, he or she can give students a choice of turning in one of two specified assignments.
4. At the end of the semester, the completed journals are handed in to the instructor.

Grading

The journal has a 50 percent influence on each student's semester grade. This percentage breaks down as follows:

1. Each of the four journal letters graded by the instructor counts for 10 percent of the student's final grade: 40 percent.
2. The completed journal, which usually contains from 20 to 24 letters, counts for 10 percent of the student's final grade. No partial credit is assigned. This grade is based on completion of work, not on quality.

The remaining 50 percent of the final grade consists of in-class letter assignments (three) and exams. The in-class assignments help the instructor monitor whether or not a student is doing his or her own work. Further, they require students to perform within a specified time frame.

Educational Benefits

In addition to requiring students to write frequently, the journal also encourages them to write carefully and well. Since students are unaware of which letters will be graded, the quality of their work usually remains consistent. And, at the same time, the instructor's grading tasks are held to a reasonable level—four of 20 to 24 journal letters and three in-class letters.

There are, however, even more specific educational benefits to be derived. One already alluded to is that the journal helps students develop their own writing skills through peer evaluation. On frequent occasions throughout the semester we assign students to groups and ask them to evaluate each other's writing. Students quickly perceive the benefit of this exercise; that is, they realize that by helping each other they improve their own skills and make better grades. A kind of reciprocal camaraderie develops. At the same time, frequent use of peer evaluation early in the semester helps to eliminate the needless repetition of foolish, simple mechanical errors—at least one student in each group usually knows the difference between *it's* and *its*.

A second educational advantage of the journal is that it can serve as a precursor for certain key lectures. Instructors can use the journal to create interest in upcoming lectures. For example, if a lecture on persuasive messages is forthcoming, the instructor can assign one or two persuasive letters before giving the lecture. As a result, students have contemplated and wondered about various persuasive strategies prior to the lecture. Lectures therefore become more relevant.

One note of warning, however. These precursor assignments should not be graded. Since students have not had an opportunity to learn the theory behind or the principles of a particular strategy, we would be treating students unfairly if we graded these assignments. These assignments should be used only as exercises in "discovery."

Conclusion

The student journal has advantages for both teachers and students. It provides an effective way for business communication instructors buried in an avalanche of student papers to maintain academic standards without sacrificing home, family, and any semblance of freedom. At the same time it provides students with a meaningful learning experience because it replicates to a considerable degree the world most junior college students plan to work in, a world that demands frequent but careful writing, a world in which writing skills are measured by promotions rather than grades.

16 The Neglected Periodic Sentence

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The basic rhetorical tool known as "periodicity" leaves the message until the end of the sentence. Periodicity applies not only to long sentences, to make them more orderly, but also to short sentences, to give them more impact. It can save words and add power. This simple device is especially useful for lending direction and focus to the writing of two-year college students.

I am not a teacher; I am a technical editor. But recently I have been reading a lot of books on technical writing by English teachers, a sizable number of whom teach in two-year colleges. These books are, incidentally, a welcome addition to the technical writing literature.

I'd like to suggest, though, that the authors may be neglecting an ancient and valuable tool, available from the basic literature of rhetoric. This tool is the periodic sentence.

Most of us long ago learned about the two types of sentences: the periodic sentence and the loose sentence. The loose sentence starts with what is important, and proceeds to describe and define it. A periodic sentence builds to a climax, with its main point at the end.

The term "periodic," or "period," is well entrenched in the literature; as witness the words of that famous eighteenth-century rhetorician George Campbell: "They are either periods, or sentences of a looser composition, for which language doth not furnish us with a particular name. . . . A period is a complex sentence, wherein the meaning remains suspended till the whole is finished."[1] The periodic sentence, then, implies a methodical construction, phrase by phrase, leading to the main point. What could be more appropriate for technical writing?

The periodic sentence also implies, however, sentences that are long and complex. And in technical writing—or in technical reading—

length and complexity are considered to be our principal rhetorical enemies. This tenet would seem to inhibit the use of the periodic sentence by the conscientious communicator.

Nevertheless, I see no reason that the *idea* of the periodic sentence cannot be applied not only to long sentences, to make them more orderly, but also to short sentences, to give them more impact. I'm sure that this idea must have emerged before. But here is my own reasoning. Sentences tend to comprise something old (the subject) and something new (the complete predicate). For example: "I [old] bought a coat [new information]. It [old] was wool [new]. The wool [old] made it warm [new]." The newsiest and most emphatic idea is in the predicate, at the end.

Note that this arrangement is contrary to what students might expect. In my own company classes in technical writing, I teach straightforwardness, directness. I teach that the summary should go at the beginning of a report, and the topic sentence at the beginning of a paragraph. However, I teach that in a sentence, the best way to convey a message is to leave that message to the end. For example, "John was slow, painstaking, and meticulous." That's a compliment. "John was painstaking, meticulous, and slow." That will get John fired. It takes no exclamation points, no underlining, no italics to give the important word important emphasis. You simply put it last.

Now, I grant that this theory sounds too much like a panacea. It is too slick, too patent. However, is it any more simplistic than the proscription against the passive voice? Many teachers and technical editors label the passive voice the *bete noire* of technical writing. But if the campaign against the passive voice is a criterion, you teachers and we editors are both cataclysmic failures. Despite our entreaties, current technical reports, written by our progeny, are overwhelmingly passive.

Why is this? What innate linguistic principle causes our brightest, thinking students to forget what they have been taught? One reason may be the power of the periodic sentence. Let me show you.

The classic sentence is "The ball was hit by the boy." Since the days of one o' cat, teachers have been pointing out that it should be "The boy hit the ball." But what if the little league batting contest is won by a young blonde? Most people would go home and report, "The longest ball was hit by a girl." The girl, of course, is the news, and we put her at the end of the sentence. The logical form is thus passive. Similarly, when we get to work late, we say, "I was held up by a traffic jam." And when we get home unexpectedly early, we say, "I was fired." The passive voice is definitely a respectable part of our language. We need it—for our periodic sentences.

I note that comedians know the periodic sentence well. They invariably leave the key words of the punch line to the end. I myself have spoiled many a joke by burying the surprise words in the middle.

But, back to technical writing. We technical writers have a special need for the passive voice. Take the sentence "Aircraft are made of aluminum." How do you say *that* in the active voice? You might try "Manufacturers make airplanes of aluminum." But this is longer, and adds an unnecessary element. We can turn the sentence around, "Aluminum is used to make airplanes." Fine. But it is still passive—and its emphasis has been changed. The original sentence tells us something about airplanes. The latter sentence tells us something about aluminum. In each case, the important word comes last. That is the principle of the periodic sentence.

Of course I do not wish to impose periodic sentences everywhere. I myself use many loose sentences, just as I use an occasional long one. And often, contrary to my teaching, I even put a topic sentence at the end of a paragraph (perhaps responding to the siren call to be "periodic"). But I do think that periodic sentences deserve consideration. Two-year college students are an appropriate audience. These students are not immersed in "engineering" writing. They are receptive, and the technique of the periodic sentence is teachable.

Notes

1. George Campbell, *The Philosophy of Rhetoric* (London: 1776; New York: Harper, 1851), 388.

Part Five: Constructing Effective Assignments

17 Teaching the In-House Memo to Technologists

Eugene W. Etheridge
Indiana State University

Since most technical students in two-year colleges are destined for supervisory positions in industry, their study of technical writing should include in-house memos. In the exercise described here, students write an action memo and a test report, the two most often used in-house memos. Examples of each memo and specific guidelines are given in class. Copies of all student memos are distributed to the class for editing by students in small groups. Both the instructor and group leaders present evaluation reports to the class on each assignment. Because the action memo and the test report are tied closely to the work students will do later on the job, these assignments and the peer-evaluation sessions are excellent motivators early in the course and foster teamwork in the classroom.

Managers in industry generally agree that communication tends to break down at the supervisory level, the point of liaison between the worker and the professional. And it is precisely at this level that most graduates in science-related majors from two-year colleges expect to spend their professional lives. Obviously then, students in technical fields need experience in writing the in-house memo.

For several years I have taught two kinds of in-house memos, the action memo and the test report. In the course evaluation that I give as part of the final examination, many students observe that the three-week segment on in-house memos is the most helpful and enjoyable part of the course. Let me share with you how I teach these two memos.

The Action Memo

Memos are introduced early in the course, partly because they are short pieces of writing, but first we organize peer-evaluation groups.

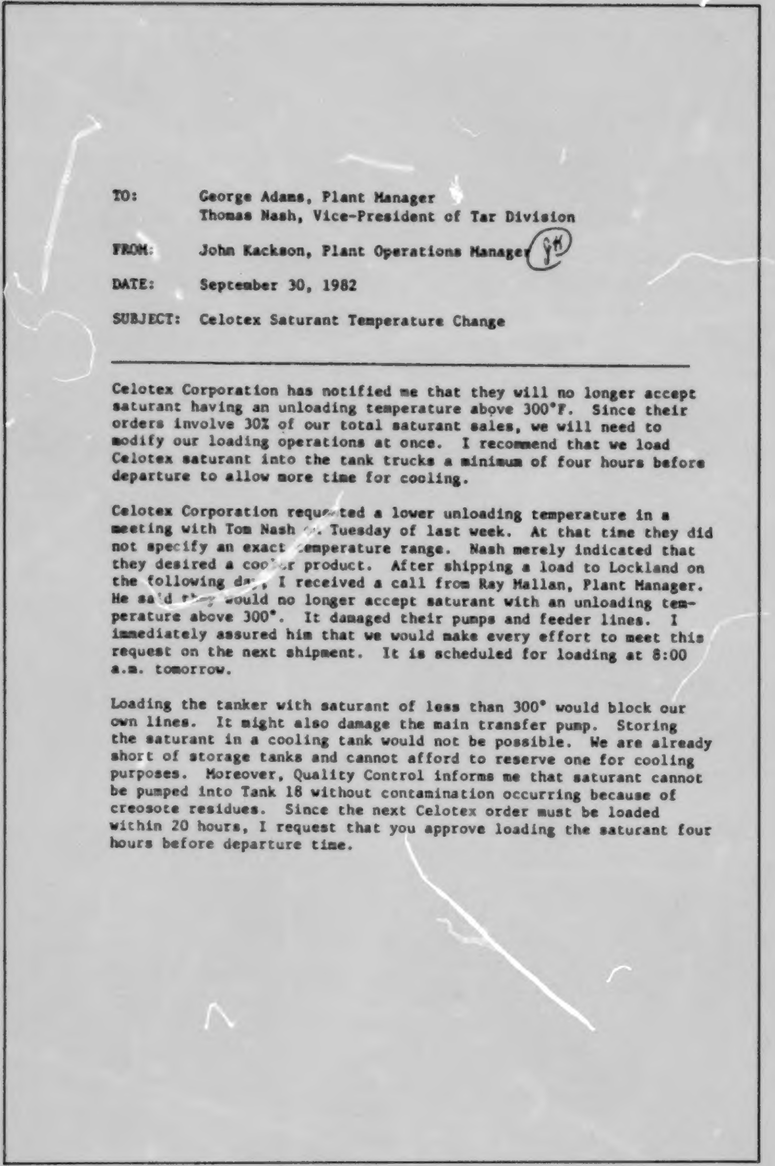
Since there are about twenty students in the class, I use four groups of five students each. Based on two early writing assignments, I designate four of the more competent writers as chairpersons and assign the others to their groups, thus achieving a reasonable balance among students from all levels of achievement.

After these groups are organized, I distribute a sample action memo (Figure 1), which we study carefully. Students then envision themselves in their future employment and create the fictional circumstances necessary to prepare a memo similar to the one I distributed. For some students, fiction is unnecessary, for they are able to draw upon experiences from summer internships or part-time jobs. Students have one week to submit their memos typed on ditto masters. I also ask them to type their group numbers on the page. Each student subsequently receives a copy of every memo written by the class.

Usually on a Friday, I put out the memos and students collate and staple their own sets, sorting them by group numbers. Over the weekend students read all memos but study and edit only those written by members of their own group. On Monday, students meet in groups to discuss the errors, strengths, and weaknesses of their memos. During the meeting, each group chairperson prepares an evaluation summary to be given to the class at the next meeting. After these reports, I give my own. It is always helpful, often encouraging, and sometimes humorous for students to compare their editorial comments with mine. During these evaluation sessions, all students are able to follow the comments because they have the complete set of memos before them. At the end of these sessions, students who received grades below an A revise and retype the assignment on standard paper for my private second reading. We follow the same procedure in grading the second memo assignment, the test report.

The action memo reports a problem and requests approval for a recommended solution and is used often in industry. The example in Figure 1 is of my own design, but it includes just about everything usually found on such memos. Its three paragraphs deal with (1) problem solving, (2) cause, and (3) assurance that the recommended action is best. I have shown this memo to several acquaintances in industry. They like it. One commented, "I surely wish I'd get memos that clear and to the point."

It is true that every problem can not be handled as fully as the one presented in this memo. A problem might not admit of alternate solutions or its cause may be obvious and need no explanation. Nevertheless, to give students experience in writing and guaranteeing full technical detail, I request that they choose a problem admitting of the treatment shown in Figure 1. Companies, of course, have their



TO: George Adams, Plant Manager
Thomas Nash, Vice-President of Tar Division

FROM: John Kackson, Plant Operations Manager JK

DATE: September 30, 1982

SUBJECT: Celotex Saturant Temperature Change

Celotex Corporation has notified me that they will no longer accept saturant having an unloading temperature above 300°F. Since their orders involve 30% of our total saturant sales, we will need to modify our loading operations at once. I recommend that we load Celotex saturant into the tank trucks a minimum of four hours before departure to allow more time for cooling.

Celotex Corporation requested a lower unloading temperature in a meeting with Tom Nash on Tuesday of last week. At that time they did not specify an exact temperature range. Nash merely indicated that they desired a cooler product. After shipping a load to Lockland on the following day, I received a call from Ray Mallan, Plant Manager. He said they would no longer accept saturant with an unloading temperature above 300°. It damaged their pumps and feeder lines. I immediately assured him that we would make every effort to meet this request on the next shipment. It is scheduled for loading at 8:00 a.m. tomorrow.

Loading the tanker with saturant of less than 300° would block our own lines. It might also damage the main transfer pump. Storing the saturant in a cooling tank would not be possible. We are already short of storage tanks and cannot afford to reserve one for cooling purposes. Moreover, Quality Control informs me that saturant cannot be pumped into Tank 18 without contamination occurring because of creosote residues. Since the next Celotex order must be loaded within 20 hours, I request that you approve loading the saturant four hours before departure time.

Figure 1. The Action Memo. Paragraph 1: Problem, seriousness, solution, cost—if any. Paragraph 2: Cause of the problem. Paragraph 3: Alternate ways of handling the problem, listed and dismissed, and a restatement of the action requested.

own ways of structuring in-house correspondence, so if students complain about my total prescription, I reply that the situation is realistic: they can expect to write the way their future employers prescribe.

The PSS Introduction: Problem, Seriousness, and Solution

The first paragraph of an action memo should be confined to three or four sentences. They should be as concise as possible, for time studies show that managers spend an average of only forty-five seconds on such a memo. First, then, is a brief statement of the problem—one sentence. The second sentence interprets the problem, spelling out exactly how serious the matter is. Here is the persuasive element that leads the manager to welcome the solution that follows. It is important for students to recognize that busy managers in corporations with complex technology do not always know exactly how serious a problem is. It is the writer's task to make sure the action is taken, so he or she provides the necessary motivation in the second sentence. The third sentence in the PSS introduction (Problem, Seriousness, Solution) states the recommended solution. Sometimes it is difficult to describe a solution in one sentence, but the introductory paragraph is not the place for development. Development, if necessary, comes later. A fourth sentence must be added, if applicable, one involving cost. Management is keenly interested in this matter. Cost, moreover, students need to be reminded, includes more than the output of cash; it involves downtime and decreased production, too. The manager must know cost before judging whether or not a solution is feasible.

It may be that the manager has the utmost confidence in the writer's expertise and judgment. Perhaps similar problems have been handled in similar ways before. Or the manager may be short of time. In such situations, the remainder of the memo may be put aside for the time being. All the information needed for making the decision is in the first paragraph.

The Cause Paragraph

If the manager chooses to read on, the second paragraph explains the cause of the problem. This is valuable information, for the cause may suggest an ounce of prevention that saves a future pound of cure. Also, since managers have a larger view of the company than the relatively narrow concerns of the technologist, they may see deeper significance and wider ramifications than would occur to the writer. Therefore, unless the cause is evident, it should always be spelled out. The cause, I remind students, might involve personnel, scheduling, and procedure, as well as the malfunction of hardware.

The Assurance Paragraph

The final paragraph of the action memo gives the assurance that the solution called for is the one most likely to work. Here the writer anticipates solutions the manager might think plausible but which the writer knows are vain or less desirable. All logical alternate solutions are listed and dismissed for specific reasons. The final line in the memo restates the proposed solution. It is the "bottom line." It persuades through repetition, polishes the ending, and provides a convenient reference for the busy reader, who, after going through a dozen such memos before noon, needs to return to this particular one later in the day. To approve the action, the reader knows exactly where to look—at the bottom line. Students should not hesitate to repeat what is important; rhetorical redundancy is a useful device in technical writing.

An Alternate Form

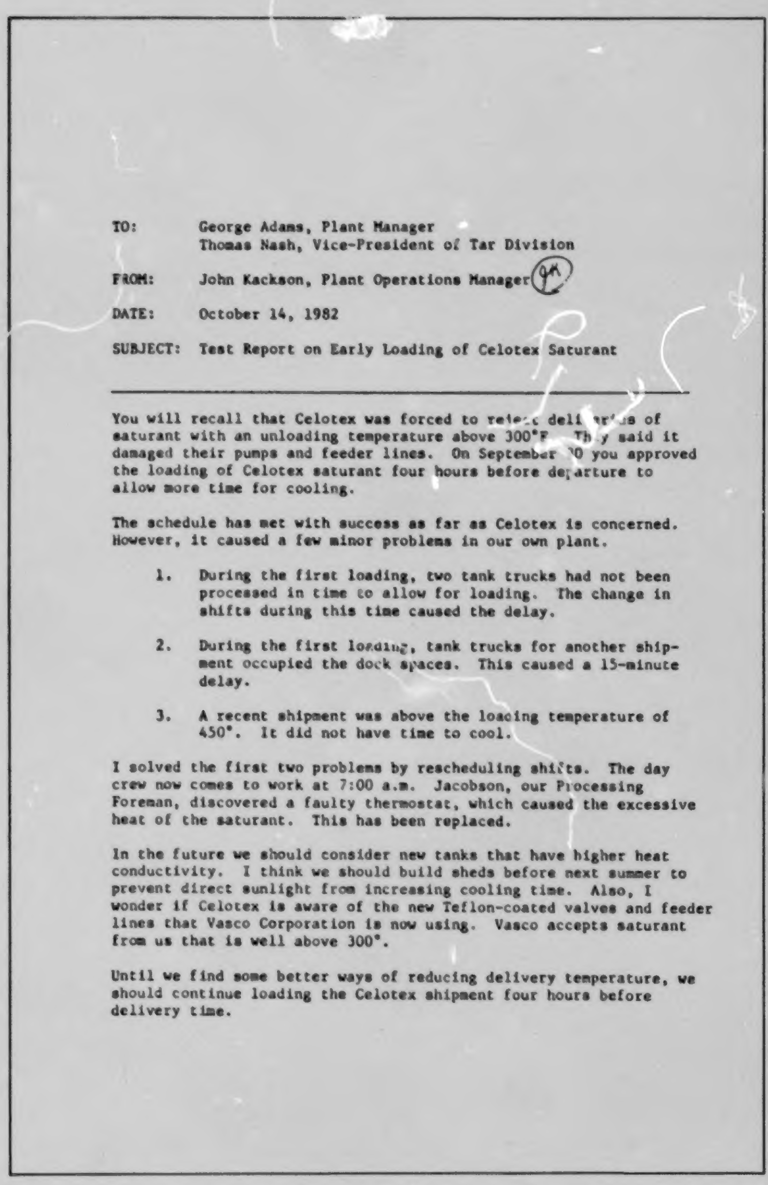
Sometimes, a longer action memo is needed because the solution requires detailed explanation. In this situation a process paragraph can be inserted between paragraphs one and two. Here the writer gives a step-by-step explanation of the procedure to follow to correct the problem. Those who make decisions need this information before they can act in a responsible way. Perhaps the manager doubts that the problem can be solved in the way recommended. The process paragraph may convince him or her that the task can indeed be performed. If students need more experience in writing action memos, use this alternate form to provide a varied and somewhat more complicated assignment.

The Test Report

The test report (Figure 2) logically follows the action memo. The action was approved, say, two weeks ago. Now the manager wants to know, is entitled to know, how things worked out. The test report gives this information. It may have up to five paragraphs.

The Transitional Introduction

Each correspondence of response in business and industry begins with a transitional introduction that serves as a bridge from where the busy executive and the writer were when the action was approved to where they are at present. It should include three pieces of information, preferably in three sentences. First, the problem is restated. The busy



TO: George Adams, Plant Manager
Thomas Nash, Vice-President of Tar Division

FROM: John Kackson, Plant Operations Manager

DATE: October 14, 1982

SUBJECT: Test Report on Early Loading of Celotex Saturant

You will recall that Celotex was forced to reject deliveries of saturant with an unloading temperature above 300°F. They said it damaged their pumps and feeder lines. On September 30 you approved the loading of Celotex saturant four hours before departure to allow more time for cooling.

The schedule has met with success as far as Celotex is concerned. However, it caused a few minor problems in our own plant.

1. During the first loading, two tank trucks had not been processed in time to allow for loading. The change in shifts during this time caused the delay.
2. During the first loading, tank trucks for another shipment occupied the dock spaces. This caused a 15-minute delay.
3. A recent shipment was above the loading temperature of 450°. It did not have time to cool.

I solved the first two problems by rescheduling shifts. The day crew now comes to work at 7:00 a.m. Jacobson, our Processing Foreman, discovered a faulty thermostat, which caused the excessive heat of the saturant. This has been replaced.

In the future we should consider new tanks that have higher heat conductivity. I think we should build sheds before next summer to prevent direct sunlight from increasing cooling time. Also, I wonder if Celotex is aware of the new Teflon-coated valves and feeder lines that Vasco Corporation is now using. Vasco accepts saturant from us that is well above 300°.

Until we find some better ways of reducing delivery temperature, we should continue loading the Celotex shipment four hours before delivery time.

Figure 2. The Test Report. Paragraph 1: Problem, cause, solution approved, date of approval. Paragraph 2: Problems encountered. Paragraph 3: Ways of handling those problems. Paragraph 4: Areas for further action, insights, future concerns. Paragraph 5: Final recommendation.

reader may have forgotton all about the matter or have only a hazy recollection of it. The reader needs a concise reminder. Second, the cause (paragraph two of the action memo) is condensed into one sentence. The third sentence is a statement of the action the manager approved and the date of the approval. This reminder is also necessary because the reader may also have forgotten this. Now the bridge is complete, and the reader is prepared to read on.

Note to students, in passing, that the opening paragraphs of the action memo and test report differ in one significant way: the seriousness of the problem is not found in the test report. Since the action was approved, the reader obviously had been convinced at the time that the problem was serious enough to require the action. Repetition in this case serves no useful purpose. Thus, the introductory paragraph of the action memo is Problem, Seriousness, Solution (and Cost); the introductory paragraph of the test report is Problem, Cause, Solution.

Problems Encountered

Paragraph two of the test report enumerates problems encountered, if any. Problems usually occur whenever changes are made, and the manager needs to know what they were. These should be blocked and numbered because the manager may want to refer to one or more of them later and may need room to write comments. The horizontal and vertical space also gives the problems added visibility.

Further Solutions

Paragraph three, which may often need to be much longer than it is in Figure 2, explains how unexpected problems were handled.

Additional Insights

Paragraph four is in several significant ways a valuable part of the test report. While solving problems, technologists often come up with helpful suggestions for preventing similar problems in the future. They may also have ideas about handling things more efficiently in other areas of their company—ideas that might not be at all related to the matter at hand. They may even have come up with suggestions for a customer, as suggested in Figure 2. Whatever the insight, if it has any value at all, this is the place to share it with the reader.

Conclusion

Paragraph five summarizes the project and includes further recommendations the writer might like to make about the specific solution.

This paragraph answers these questions: Did the solution work? How well? Should we consider further modifications? What are they?

Ensuring the Success of Memo Assignments

By way of conclusion, I have three further points to make regarding the action memo and the test report. First, students should be cautioned about choosing the right subject. They should carefully and realistically think about problems they might encounter in their future employment. Experience has taught me that the following advice to students helps to guarantee a good memo:

1. Choose a technical problem. It is too easy to write about personnel problems—and usually too easy to solve them. It is true that personnel may cause problems, which can be indicated in paragraph two of the action memo, but the problem itself should be of a technical nature.
2. Choose a problem that requires a tailor-made solution, not one solved by the purchase of new equipment.
3. Choose a problem you can solve, then present your solution. Don't recommend that the problem be solved by calling a committee meeting or by somebody else.
4. Choose a problem that generates from your own work, not one caused by some other company.
5. Offer only one solution. You are passing the buck if you force your reader to make the choice from among several solutions. Remember, your reader knows less than you do about the immediate problem; he or she is less qualified than you to choose between two courses of action. And rarely, if ever, are two solutions of equal merit.
6. Report only one problem per memo. Each problem requires a solution. Managers may want to share certain problems with various people, so they need each problem on a separate sheet of paper. This rule is common among all businesses: one problem to a memo.

Second, since I assign these memos early in the semester, I have not yet delivered lectures on technical style. Therefore, I share with students the following advice, which I discuss with them in fuller detail later in the semester.

1. Use the active voice. A memo, like a letter, is a personal correspondence, vis-à-vis a given reader. Speak directly to the reader, avoiding passive constructions whenever possible.
2. Use simple rather than compound sentences. Two sentences for two coordinate ideas are better than one sentence containing both ideas.

3. Strive for the simple sentence of twelve to sixteen words.
4. Forget about coherence. Choppy writing that gets the message across fast is better than smooth writing that consumes more time for both writer and reader. Although letters should make graceful use of transitional expressions, these are unnecessary frills on this kind of in-house correspondence.
5. Strive for unity. Keep all nonessential data out of your memo.
6. Keep vocabulary as simple as possible.

Third, and finally, the peer-evaluation sessions. I must confess that when I first considered using them I had serious misgivings. Would some students be too harsh in their criticisms and send classmates storming from the room? Did students know enough about writing to do more than a superficial job of evaluating memos? These misgivings, I am happy to say, were wholly unwarranted. Instead, I found that students were highly motivated to write their very best because peers were reading their work. Rather than being discouraged by each other's criticism, they took courage when they discovered the kinds of errors they themselves make in the writing of their colleagues, especially those they thought were superior writers. As for the quality of student editing, I am delighted to report that through group effort students discovered far more errors than they do when working individually.

But perhaps the two most valuable benefits of the peer-evaluation sessions and the memo writing assignments are these. First, the simulation of what happens in the world of business and industry is an excellent motivator, especially early in the technical writing course. Second, the experience in teamwork not only reflects the nature of much of the work students will do on the job but also establishes, again early in the course, an esprit de corps that often carries over throughout the semester.

18 The D.M.I. Letter: A Case Study

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Behrend College of Pennsylvania State University

The student plays the role of a staff member for the treasurer of a power company that owns a nuclear energy installation. Having suffered a nuclear accident similar to the one at Three Mile Island, the company is besieged by demands from government for reports on the accident. The student-as-staff-member is directed to say "no" to a consumer-advocate group. The difficulty of the task may be adjusted by including or excluding various pieces of information.

You are the newest staff member in the Office of the Treasurer of Gotham Addison, parent company of those power companies that collectively own two-thirds of the D.M.I. Nuclear Power Installation. Two months ago, D.M.I. narrowly averted a catastrophic nuclear accident. Since that time, the treasurer's office has been working twelve- to fifteen-hour days supplying figures on the cost of physical damage to the plant and "shut-down" time and figures to forecast "recovery" time (that is, how long will be required to again make a profit). Each time a request (really a demand) is made for information, that request is accompanied by an "if": how much would it cost *if* this or that or this and that should occur. Each request thus requires an entirely new set of figures. So far, figures have been tailored for reports demanded by three state offices, ten federal regulatory agencies, and a House Congressional Special Committee on D.M.I. Figures remain to be given to reports for two state committees, five federal regulatory agencies, the Governor's Office, and the White House. New demands are arriving daily, including one from the Department of Agriculture, which is responsible for monitoring the level of radiation in cow's milk, corn, soybeans, and other crops and commodities.

After a Sunday vacation, you return to your office Monday morning only somewhat rested. As you open the outer door to your office, the personal secretary to Ms. Dawlish, the Treasurer, hails you.

"Dawlish wants you to take care of this right away," he says, pulling a sheet of paper from the bottom of what appears to be a full ream he is carrying.

Once in your office, you read the sheet, a letter from a nationally known consumer advocate:

> Dear Ms. Dawlish:
>
> As you may know, the Consumer Advocate's Association which I head is opposed to nuclear-generated power. Although the so-called "D.M.I. Accident" has no doubt done more to hasten the day when nuclear power in this country will be banned, we do not want to judge hastily that the accident resulted from sloppy management, the immoral or illegal granting of bids, or stupidity. In order to determine causes, CAA wants to examine the "accident" calmly and judiciously. As part of this effort, we request that you supply us with a report detailing every aspect of the cost involved in building the D.M.I. Installation. This effort is being made on behalf of the American people, many thousands, perhaps hundreds of thousands of whom have had their lives threatened by this "accident," and the millions who live under the shadow of other similarly built installations. The American people not only have a right to know, but also you, as a public utility, have a responsibility to make sure that the people know what happened and why.
>
> We would appreciate your providing us with a date when our accountants can meet with yours in a preliminary meeting for the purpose of agreeing upon the kind and amount of data the public needs. This, of course, is only the first step, and any suggestions you can provide to facilitate the transfer of information would be appreciated.
>
> Sincerely,
>
> Wanda Freshwater, President
> Consumer Advocate's Association

On the top of this letter and in Dawlish's hand, you note the following:

> We can't, just can't do this now! There's no time! No resources available! We've got everybody's aunt in the state and in D.C. on our backs. We might not be able to do what she asks for months. And we can't have Freshwater filing a class action suit against us at this point. GA's President has said that the legal office is overrun with lawsuits, potential and actual.
>
> But remember that Freshwater is no fool. She's intelligent, sophisticated, and really quite powerful. Who knows, she may even ultimately be good for this country. But we just can't do it now! Write a letter to F. for my signature saying so.

After some frantic phone calls, you discover the following information, which may or may not be useful:

Under the state's "Sunshine Laws," Freshwater and her group have a right to this information if they can argue a "clear and present danger." You suspect that they wouldn't need to argue too strenuously.

Up to the day of the accident, D.M.I. had the second-best record of the twenty-seven nuclear power installations east of the Mississippi.

The people of the state in which D.M.I. is located voted twelve years ago 73 percent to 27 percent in favor of nuclear power for electricity. The results of this referendum were widely used by GA to push for the rapid completion of the installation.

R. B. Schneidler and Co. and Scarlatti Construction, two of the contractors who built D.M.I., are currently under investigation on charges of fraud, kickbacks, and other illegalities (including sanding the concrete) in the building of several sections of interstate highway in a neighboring state. This job was contracted out fewer than seven months after they completed their work on D.M.I.

Freshwater receives a considerable income each year from a trust set up by her mother. That trust is administered through the Omega Fund, a Madison Avenue firm once controlled by Freshwater's father. Omega sold the land upon which D.M.I. now stands to Gotham Addison.

Comment

This case study comes under the heading of the "difficult letter" and requires that students avoid a number of traps built into it:

1. Many students will agree with Freshwater. That is, many are opposed to nuclear power, and the temptation to allow the emotion of that agreement to dominate the letter may be considerable. However, a significant issue in this letter is one of obeying priorities. Laws require that certain groups be attended to first. Freshwater's group, unfortunately perhaps, is relatively low in the list of priorities—under the White House, the Governor's Office, and most of the regulatory agencies. Nevertheless, the issue is when, not if, the information will be supplied.
2. Some students will disagree with Freshwater and be tempted to write nasty letters. This response should seldom, if ever, be made. Students should recognize that one simply doesn't talk that way to a person as influential as Freshwater.
3. Students for nuclear power may want to use the information about the Omega Fund. They shouldn't; Freshwater has no control over Omega.

4. Students for nuclear power may want to use the information concerning D.M.I.'s safety record. This piece of information provides a rhetorical trap for the student who reads too cursorily.

But one doesn't want merely to set traps for students. The purpose of the assignment is to provide students with opportunities for demonstrating what they have learned. Thus, the following pieces of information have been inserted:

1. Dawlish is not entirely bearish on Freshwater. The treasurer's statement to the effect that F. may be "good for the country" ought to alert students to that fact.
2. It probably would do little good simply to list all the reports that were "requested" before Freshwater's letter, although many students will pursue that line. Excellent students, however, will turn the fact of those reports to good advantage. That is, they may indicate in some delicate way that Freshwater ought to secure copies of these numerous reports, digest them, and *then* GA would be "happy to supply additional information, answer questions, etc." This tactic buys time, and buying time is the crux of this letter.
3. The student who finds a way to include *advantageously* the information concerning litigation against the two construction companies earns my admiration.

Perhaps the greatest appeal of this case study is its apparent similarity to the Three Mile Island accident in Harrisburg, Pennsylvania. Although the details of the D.M.I. case are largely conjectural, I believe that something like it must have happened. Further, almost everyone is familiar at least with the television and newspaper versions of the accident. Since it occurred in late March of 1979, the accident will be remembered by students in our classes, probably for the next four years or so. Further, I do not believe that such a case will become dated for quite a while.

In its entirety, the D.M.I. Case Study is relatively long and sophisticated, and it was intended to be. Only in this way can the occasional class of sophisticated and experienced two-year students be challenged. On the other hand, by omitting one or more items of information, the instructor may easily scale the case study to the experience and sophistication of the class. The "fact" that D.M.I. had the second-best safety record in the East, for example, could be simplified to indicate that D.M.I. had the best safety record in the nation. Such a change provides even the least experienced students some heavy ammunition.

19 Teaching the Description of a Specific Mechanism

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This exercise requires students to write concisely, accurately, and quickly. It asks them to describe a specific mechanism, in this case a toy car, for a specific audience. Students prepare in class a plan sheet, which is evaluated by the instructor before the next class meeting. Students use this sheet to write the description, again under the time constraints of a class period. After the instructor has evaluated these descriptions, students may revise them before a final grade is assigned.

One of the major problems my technical writing students had in the past was understanding how to describe a specific mechanism. Their descriptions were vague, and they often failed to show how the mechanism functioned when all its parts were in operation. These and other problems set me in search of a way to help students write clearer and more concise descriptions of specific mechanisms.

John Harris of Brigham Young University once described how he had his students describe gun parts. I did not have gun parts, but I do have a son who collects Matchbox toy cars. What follows is an account of the assignment I developed to teach the description of a specific mechanism.

Students

The students for whom I designed the assignment are first semester freshmen attending a technical-vocational college. They major in a wide variety of such technological fields as electronics, construction, drafting, diesel mechanics, auto mechanics, and secretarial, so classes are mixed.

Objectives

The description of a specific mechanism is part of communications situations in school and on the job. The company employee who writes a parts order, prepares an order for repair, writes specifications, or provides instructions for using equipment needs to describe specific mechanisms. Students who write reports for other classes also use this technique to describe equipment used in experiments.

The objectives I use for this assignment come from chapter two in the second edition of Nell Ann Pickett and Ann A. Laster's *Technical English: Writing, Reading, and Speaking* (San Francisco: Canfield Press, 1975). I expect students to be able to define what is meant by the description of a specific mechanism and to plan and write such a description. More specifically, students should be able to alter the emphasis of a description according to whether the reader needs to locate the mechanism, to repair it, or to use it. Students should also be able to describe the mechanism in two states, at rest and in operation. More long-range objectives include using the description of a mechanism as part of another rhetorical technique (such as extended definition), using descriptions of mechanisms as part of a report for another class in technical writing or in the student's major field, and using the technique successfully on the job, whether the part or mechanism is received, repaired, located, or put to use.

Background Assignments

The description of a specific mechanism is assigned during the sixth week of the semester and follows three writing exercises: instructions, description of a process, and description of a general mechanism. Each of these assignments included class discussion of rhetorical techniques (especially the reader's influence on writing), exercises done in and out of class, and examination of examples (some of which were located by students). Before completing each assignment, students complete a plan sheet, as outlined by Pickett and Laster (see, for example, pp. 53–54 and the example that follows).

Step-by-Step Method

First class meeting. Our discussion of the textbook section on the description of a mechanism emphasizes the usefulness of such descriptions in other classes and on the job. Students are asked to bring a ruler capable of measuring 1/16 of an inch to the following class meeting.

Second class meeting. Before distributing the Matchbox cars (what the mechanism will be is kept secret until later), I provide these instructions for completing the plan sheet.

1. The mechanism is complete unto itself and must be described as the student receives it. It is not to be described as a model for a larger vehicle.
2. If the mechanism received is defective, the student must describe all defects, including missing or bent parts and chipped paint.
3. The student is to be very specific about readers and purpose. "General Adult Reader" is not specific enough.
4. The student is to decide which of three aspects will receive major emphasis: parts (for repair), physical characteristics (for someone trying to locate the mechanism), or function (for someone trying to use the mechanism). The description must, however, contain all three points.
5. The order in which major parts are listed should reflect the way the reader would visualize the mechanism. Readers with different purposes require different ordering of major parts.
6. The student may not use graphics on this assignment. (Graphics are used with other assignments.)

Then, I ask each student to take one Matchbox car from a sack and to spend three to five minutes examining it before turning to the plan sheet.

Students are free to ask questions as they develop their plan sheets. I emphasize again the points I made before: the toy car is to be treated as an exact mechanism; all details are to be noted, including dents and chips. Students usually apply knowledge and insights from their major fields of study. Those in automotive mechanics, auto body, and business are quick to see applications. Those in construction, electronics, and secretarial programs have a harder time. After questions about the assumed reader, I help students "talk through" who might want to read about the toy and why. I suggest situations where a description of the mechanism might prove helpful—a letter to a lost-and-found department, an ad to buy or sell in a car collector's magazine, a specialized article about a particular car (perhaps it was the first of its type, or the last). Some students quickly identify their readers and make suggestions to others who are having problems. After the problem of reader and situation is solved, students complete the plan sheet with little difficulty.

I do provide one further aid. Since students will have to describe the car's interior, I encourage them to inspect and measure a car that has come apart. Since most of the cars have a similar design, students can deduce the interior parts of the cars they are describing.

I collect the completed plan sheets and the cars and announce that they will be used at the next class meeting. In the interim, I read through the plan sheets, making certain that students have completed all items and paying special attention to the assumed reader, the physical characteristics, and the order in which major parts are listed. Has the student responded to the situation from which the writing comes? Have the assumed reader's needs been satisfied? I do not grade these sheets, but I do note strengths and weaknesses. Most students realize by now, the sixth week of the term, that effort spent on the plan sheet is time saved when the report is written. A typical student plan sheet follows.

Plan Sheet for Describing a Mechanism

Mechanism. The name of the mechanism I will describe is *Gorgi Junior Whizwheels Land Rover.*

Purpose. The purpose of this description is to give *a specific description* (a general description, a specific description).

My description would be useful to *a lost-and-found department.*

Audience (Intended Reader). I am writing this description so that *an employee in a lost-and-found department* can understand what I am saying.

Definition, Identification, and/or Special Features of the Mechanism: *a child's toy.*

Function. The function, use, or purpose of this mechanism is *to roll along a surface to resemble the movement of a normal-size pickup truck.*

    Who uses the mechanism: *anyone who wants to play with a toy pickup truck*
    When: *when playing*
    Where: *indoors or outdoors*

Physical Characteristics.
    Size: *2 3/4" × 1 1/16" × 1 1/8"*
    Shape: *rectangular, similar to a pickup truck*
    Weight: *3 oz.*
    Material: *metal, plastic, rubber*
    Other:

Major Parts.
metal body
plastic chassis
four tires
two wire axles

Description of Major Parts.

Part	Function	Physical Characteristics
metal body	*attractiveness, place to hold when rolling toy.*	*Shaped like a pickup truck. Cab has five windows which are covered with yellow plastic. Green painted metal in a rectangular shape, 2 3/4" long, 1 1/16" wide and 7/8" high from base to cab top, 7/16" high from base to hood and base to bed top.*
plastic chassis	*holds metal body, houses wire axles and wheels.*	*Black plastic 2 3/4" long by 15/16" wide. On both ends are indentations running crossways where the wire axles are housed. On each corner are four rectangular shaped holes where the tires fit.*
four tires	*enable the toy to roll along a surface.*	*Black rubber discs of 7/16" diameter, 3/16" wide. Silver paint on the outside resembling hubcaps. Small hole in center of each (1/32").*
wire axles	*hold tires to chassis and enable them to roll.*	*Silver metal wires 1 1/8" long, enlarged at each end to hold tires on.*

Operation. The individual parts work together in this way: *The chassis holds the body on and houses the axle wires. The axle wires hold the tires in place and allow them to roll.*

Variations. The mechanism can have these variations or special features: *Body paint colors are the only variations.*

Third class meeting. The students pick up their plan sheets and Matchbox cars at the beginning of the period and prepare to write.

They have fifty minutes to complete the description. If students were absent the previous period, I give them personal attention as they develop their plan sheets. They come to my office the next day to write the report. Under no circumstances are they allowed to write the paper out of class since one element of the assignment is to describe a specific mechanism quickly and accurately.

Evaluation

When I evaluate this assignment, I note syntax and grammar, but I pay special attention to these questions.

1. Has the student written to the reader identified on the plan sheet?
2. Has the student mentioned the reader and the significance of the description in the first paragraph and in a way other than "The reader of this paper is assumed to be . . ." and "The purpose of this paper is . . ."? I have discussed these points in class before, but discovering ways to handle this material within a given context is always a challenge. I do not reduce the grade for errors here, but I ask for revisions, and the grade will be affected on subsequent assignments if the errors persist.
3. Has the student given proper emphasis based on the reader's need for information?
4. Is the mechanism accurately and concisely described? To make the point, I sometimes reproduce one or two papers, leaving off the writer's name and the specific name of the Matchbox car. I then ask students to use the description to draw a picture of the car or to pick it out of a group of cars. The results can be very interesting.
5. Has the student included information on sub-assemblies such as the interior?
6. Has the student described the mechanism performing its characteristic function? Are all of the parts mentioned in the sequence?

Students use my comments to revise their descriptions and hand them in the next period for a final grade. The complete description of a Matchbox car and my comments on it follow. This description correlates with the plan sheet reproduced earlier and was written by the same student.

Description of a Specific Mechanism

A toy has been lost in your store by Jimmy Pickens, age nine, of 1323 Rider Drive, Culot, Oklahoma. It is of great sentimental value and its return would be greatly appreciated. The following description of the toy should be most helpful in its recovery and return to the owner.

The toy is a Gorgi Junior Whizwheels Land Rover, similar in appearance to a miniaturized pickup truck. It is rectangular in shape, its dimensions being 2 3/4″ × 1 1/16″ × 1 1/8″, and it weighs approximately 3 ounces. The major parts of the toy are a metal body, a plastic chassis, four rubber tires, and two wire axles.

The most obvious and easily recognizable feature of the toy is the metal body. It is painted metallic green, although the paint is chipped off on the corners. The body resembles that of a pickup truck, having a bed and cab. The cab has five windows which are made of yellow plastic. The entire body is 2 3/4″ long, 1 1/16″ wide, 7/8″ tall from the base of the body to the top of the cab, and 7/16″ tall from the base to the top of the bed and hood.

Another distinct feature which will help identify the toy is the plastic chassis. It holds the metal body on and houses the axles and tires. It is made of black plastic and is 2 3/4″ long by 15/16″ wide. On either end there are rounded protrusions where the axle wires fit. On each corner there are rectangular holes cut, 5/8″ × 3/16″, where the tires fit. On the flat portion of the chassis between the two protrusions, the name of the toy and patent number are printed.

The axle wires should only be visible on the outside of the tires, where the bulblike knob on the end of each wire holds the tire in place. The wire is silver-colored.

The tires are made of black rubber and are 7/16″ in diameter with a width of 3/16″. They have distinct silver painting on the outside resembling hubcaps.

The only moving mechanisms on the toy are the tires. The doors on the truck do not open, nor will the bed move.

If this item is found, please contact Mrs. David Pickens, mother of the boy, at 665-3720, or 1323 Rider Drive, Culot, Oklahoma 74264.

Teacher Comments

1. Situation is clear. The focus/emphasis is correct—on the physical characteristics to help someone locate the toy.
2. Writing is good except for overuse of passive voice.
3. Where and on which corner(s) is the paint chipped (see paragraph 3)?
4. Why not use letter format? Also, you could use headings.
5. You do not mention the interior in detail and did not need to because of the situation.
6. Grade is B+ revised to an A if the report is rewritten.

20 Developing and Presenting Library Instruction for Technical Writing

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Library instruction familiarizes technical writing students with the research tools and professional literature they need in college and later on the job. The instructor can provide this instruction by making color slides of major information sources and correlating them with lectures and a carefully designed library report to be completed by students. A walking tour of the library follows the slide presentation and lectures. On this tour, the librarian shows the class the location of each research tool covered in the slide presentation. Library instruction, which takes approximately three hours of class time, can provide the basis for other important resource-based assignments; six examples are given.

In an article summarizing a United States Air Force study, Richard Davis reports why engineers believe technical writing to be such an important course.[1] Davis also states that the engineers surveyed believe library instruction to be one of the important topics covered in technical writing. Library instruction is particularly important for junior college students for four specific reasons: (1) It improves the content of reports. Students are more likely to produce quality writing when they have something to say. Merely telling students "to go to the library" does not ensure that the content of reports will be improved. (2) The reference materials that students discover in a library instruction program will be useful to them in other college courses and in future jobs. Students need to know the major journals, handbooks, dictionaries, encyclopedias, indexes, and professional associations in their chosen fields. They need to know how to assess the state of a problem in their field and to learn as early as possible that periodicals, not texts, are the most current statements of "what's happening" in any field. (3) Students who transfer to senior colleges are better able to adjust to research assignments if they possess a basic knowledge of library resources and library organization. (4) Instruction in the availability and use of basic government documents is valuable to the student in many college classes as well as in personal and community projects.

Once you have decided to include library instruction in your technical writing course, you may wish to work initially with instructional service librarians to develop the content and format of these sessions. Librarians can also conduct the sessions; however, a more effective arrangement allows you to assume essential responsibility for the lecture portion of library instruction, while the instructional librarians conduct the walking tour of the library that follows. You will find that conducting your own lectures has definite advantages: (1) Students are less reluctant to ask questions. (2) Because librarians are so familiar with the material they are presenting, they tend to cover it too rapidly. If students become lost early in the session, they tend to "turn off." In short, you know your class—their majors, their instructional needs, their intellectual level. You know how to pitch library instruction so that students really understand how to use the resources you are introducing. (3) Presenting your own lecture sessions is particularly advantageous with large technical writing classes (30–50 students), the typical situation in most junior colleges. But even with small classes, students are more responsive to a teacher with whom they are familiar.

While many technical writing texts used by junior colleges discuss how to use library resources, you will find that relying on textbook-based discussions is usually ineffective. Students cannot, merely from reading descriptions of library resources, learn how to use them or which ones are available in their own college library.

Organizing the Sessions

A basic library instruction unit requires at least one week and should be divided into two parts: (1) lectures on resources (at least two one-hour sessions) and (2) a thirty-minute to one-hour walking tour of the library facilities after the lectures. On the tour, the librarian in charge should show students *specifically* where the resources discussed in the lectures are located. Thus, you must work closely with your librarians to ensure the success of your sessions. If you find your own background in bibliography to be weak, you may wish to ask the librarians to conduct the lectures until you are ready to assume them yourself. Carefully observing the librarian's lecture and description of resources and examining research tools that are unfamiliar will prepare you to take over the lectures after several semesters. You will also find that becoming familiar with the research resources your students need to use will help you to help them find and develop report topics.

Your lectures will be more effective if you incorporate 35 mm color slides and distribute copies of the library report form that follows. As will be explained later, the slide presentation follows the order of items on the library form, so wide margins will enable students to take notes as the slide presentation is in progress. Requiring students to complete the library report is essential because it obligates them to examine the major research resources you cover in your lectures. Without this assignment, students adopt a casual attitude to the library lectures and retain little useful information. Completing the report reinforces the information you present in your slide lectures and emphasizes how various resources are to be used.

Technical Writing: Library Report

Name ______________________________

What is your major? ____________ Your area? ____________

What is your research topic? ______________________

The Card Catalog

1. When you checked your topic in the *Subject Headings List,* what headings in the card catalog were given?
2. What headings did you examine in the card catalog?
3. What headings furnished the most information?
4. According to the card catalog, what information guides are available in your field? (Look for a card marked "[name of field]—BIBLIOGRAPHIES.") Give the name and call number of these information guides.
5. What encyclopedias are available in your area? Give the title and call number for each.
6. What handbooks are available in your area? Give the title and call number for each.
7. What dictionaries are available in your area? Give the title and call number for each.
8. What other specialized information resources did you find? Give the title and call number for each.

Indexes

Check the indexes you consulted. Supply the years. List others that you found during research and the years consulted.

___ *Readers' Guide,* years:
___ *Applied Science and Technology Index,* years:
___ *Essay and General Literature Index,* years:
___ *Biological and Agricultural Index,* years:

___ *Social Science Index*, years:
___ *Education Index*, years:
___ *Business Education Index*, years:
___ *Business Periodicals Index*, years:
___ *F&S Index of Corporations*, years:
___ *ERIC*, years:
  ___ *RIE*
  ___ *CIJE*
others:

Reference Books

The following three reference books are available at the library's reference desk. Ask for them by name. Examine all three to answer the following questions.

Business Information Sources

Encyclopedia of Business Information Sources

Guide to Reference Books

1. Are abstracts available in your field? If so, list the title. Does our library have these abstracts? Check the card catalog and give the call number if we have the abstracts.
2. Are statistics sources available in your area? If so, give the title. Does the library have these? If so, what is the call number?
3. Are specialized indexes available in your area? If so, give the title. Are these available in our library?
4. What is the major professional association or society in your field? What is its address?
5. List the major journals in your field. Consult the Serials List to see if our library subscribes to each journal. Give the call numbers for the journals to which we subscribe.

Newspapers

1. Did you consult newspapers? If so, which ones? What years did you cover?
2. What headings were most useful when you examined newspaper indexes?

Government Documents

Examine the following three indexes to government documents:

Index to U.S. Government Periodicals

U.S. Government Publications: Monthly Catalog (also check the *Decennial Cumulative Index*)

American Statistics Index

1. Where is the nearest depository library?
2. List by complete title and Superintendent of Documents call number the government documents you found that are relevant to your topic.

> *Automated Information Retrieval Service*
>
> If you chose to use our computer service, what key words were the most valuable? What resources did you gain from the computer search that were applicable to your report topic?
>
> *Preliminary Bibliography*
>
> List sources—include author, title, publication information, and page numbers—that you will use to investigate your topic. This list should be "proof" that your topic can be adequately researched, that the topic is sufficiently discussed in the literature in your field.

Assigning a formal research report before beginning library instruction provides an authentic point of departure since the library resources presented will enable each student to compile a working bibliography, which is also the last section to be completed on the library report form. If a proposal for the research report is required, students can submit the library report with the proposal. The completed library report should offer convincing evidence that enough material is available to produce the research report as proposed. Thus, library instruction becomes a concomitant assignment to report writing.

The Slide Presentation

Preparing and collecting slides is relatively easy if you follow the format suggested below. The format can be easily adjusted to fit the needs of your students and the resources of your library. Remember to adjust the library report form to follow the content and arrangement of your slide presentation.

Most slides described here were made by the media center, although a friend who uses slides for teaching basic composition was kind enough to make several additional slides for me. The initial cost of slides is substantial, but duplicate sets can be made rather cheaply. When several faculty members are presenting library instruction, one set of slides may not be enough. When compiling and organizing a collection that best suits the research needs of your students, consider the major fields and interest areas of students who regularly enroll in technical writing (business, technology, data process, for example). Then prepare slides that trace one subject heading (such as "housing" or "retail trade") from a topic relevant to one of those fields. This effort takes time, but tracing a single heading helps students realize that several indexes, not just one, are useful in compiling information about a given subject.

After you have decided which resources to present to your students, prepare at least two or three slides for each resource: (1) a view of the cover of the work, (2) a view of a typical entry, and (3) a view of a portion of the abbreviations page, if the work contains one. This third slide is useful in showing the kinds of periodicals indexed. Many reference works, however, require more than three slides to show their capabilities. After seeing a slide series for a particular reference work, students should know what the work looks like, what its value is, and how to use it. A slide series for the *Readers' Guide*, which is organized like many basic indexes, follows:

Slide one: Cover view. Include in this shot a bound volume and a monthly index.

Slide two: View of a portion of the abbreviations page.

Slide three: Close-up of a single entry in the *Readers' Guide*. Choose one that includes cross-referencing.

Your slide presentation might include the following reference works, which correlate with the items listed on the library report form.

Library of Congress Subject Headings List (two slides, cover view and sample entry)

Card Catalog (three slides—title card, author card, subject card of the same work; two or three slides of "header" cards, for example, "Handbooks")

Indexes

Readers' Guide (three slides—cover, abbreviations page, sample entry)

Applied Science and Technology Index (three slides)

Essay and General Literature Index (three slides)

Biological and Agricultural Index (three slides)

Social Science Index (three slides)

Education Index (three slides)

Business Education Index (three slides)

Business Periodicals Index (three slides)

F&S Index of Corporations (three slides—cover view and one sample entry from each of two main indexes)

ERIC (eight slides)

Thesaurus of Descriptors (two slides, cover and sample entry)

Resources in Education (three slides—cover, entry, abstract)

Current Index to Journals in Education (three slides—cover, subject heading entry, main entry)

Abstracts

Determine the abstracts that your library has available. Choose those most appropriate to your students' expertise, intellectual level, and subject areas. Many abstracts are too technical for junior college students, unless they are adults with extensive work experience in their area of study. Generally you will need two or three slides, a cover view and one or two sample entries. You might consider including the abstracts listed below.

Sociological Abstracts

Work Related Abstracts

Energy Research Abstracts

Educational Administration Abstracts

Psychological Abstracts

Personnel Abstracts

Science Abstracts

Newspaper Indexes

New York Times Index (two slides, cover and entry)

Wall Street Journal Index (three slides—cover, company title entry, business topic entry)

If your regional or local newspapers have indexes, include sample slides from them.

Government Documents

While a complete treatment of government documents is impossible, the following reference tools introduce students to major government indexes and familiarize them with the range of information available in government publications:

Index to U.S. Government Periodicals (three slides—cover, abbreviations page, sample entry)

Monthly Catalog of U.S. Government Publications, annual index (one slide cover)

Monthly Catalog (three slides—cover, index entry, corresponding item description)

American Statistics Index (three slides—cover, index entry, corresponding abstract entry)

The total number of slides will be approximately ninety, depending on the number of resources included and the number of examples selected from each. In addition to these slides, include several "comic relief" slides to break the intensity of the presentation. Use your imagination, or visit a photographic supply store that carries suitable slides for this purpose.

As you present the slides, be sure to explain carefully the organization of each reference work and the abbreviations used. Students need to know what each source is, what it looks like, how it is organized, and how it is used. Develop your slide collection and presentation with those four goals in mind.

And Afterward, a Walking Tour

Following the slide lectures, a librarian takes students on a walking tour of the library to show them where each reference tool covered in the slide presentation is located. If time permits, students should examine some of these materials. A quick review of the card catalog and the use of the *Subject Headings List* is helpful; students tend to overlook this list before announcing, "Our library doesn't have anything on my topic."

In conducting the walking tour, the librarian should follow the order of materials on the library report form. This procedure helps students remember specific works and their location. If your library subscribes to an automated information retrieval system, the librarian should explain this service—usage procedures, a description of the system, its cost. At the end of the tour, the librarian should also demonstrate how to use microfilm and microfiche readers. Students should, of course, recognize that the tour is only an introduction to the library's resources and not a complete description of available resources.

Further Applications of Library Instruction

Many other assignments can be developed from this kind of library instruction, assignments that teach the research skills necessary for students who transfer to four-year colleges and for all students later on the job. Here are six assignments that will broaden students' knowledge of their fields and familiarize them with a variety of research tools.

1. Survey the contents of several issues of any major journal in your field for 1960 and then for 1980. How do the contents for 1960 differ from the contents of 1980? What major topics were covered during each year? What significant changes in your field can you infer from this comparison? Write a short report in memo form that explains your findings. Choose appropriate headings.
2. Examine a current topic in your field in as many indexes as you believe to be applicable. According to current journal articles (those published within the past three years), what main aspects of the topic are being discussed by writers in your field? Write a two-page summary of your findings.
3. Photocopy a short journal article that you are using in a research report. Write a descriptive abstract and an informative abstract for the article. Submit the photocopy and both abstracts.
4. Select a single issue of two journals in your field, both published in the same year. In a short report in memo form, analyze the audience. What is the audience to which each journal is directed? How can you determine the audience? Explain how presentation and subject matter fit that audience.
5. Photocopy a journal article that you consider to be especially well written. In a short report in memo form, analyze the article, explaining the stylistic qualities that make the article "well written." Submit the article and your analysis.
6. Find the name and address of the trade association or professional society in your field. Using correct business letter form, write a letter of inquiry asking about requirements for joining the society. Explain your background and interest and ask about the availability of student membership rates.

Notes

1. Richard M. Davis, "How Important Is Technical Writing?—A Survey of the Opinions of Successful Engineers," *Journal of Technical Writing and Communication* 8 (Fall 1978): 207-16.

Part Six: Reading and Writing Reports

21 The Minireport: An Alternative to Formal Reports in Basic Business and Technical Writing Classes

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By assigning a minireport in introductory business and technical writing classes, instructors can achieve many of the goals of the traditional report unit in only five fifty-minute class periods. A minireport consists of only four items: title page, letter of transmittal, table of contents, and summary abstract. It reduces the time instructors and students in two-year programs must spend on reports by stripping the assignment of those portions which merely duplicate what students have already learned in other assignments and focusing on those portions where new skills justify making the report a separate assignment: report format, organization, and logic.

Finding time to cover all the elements of researching and writing a formal report in a single course in business or technical writing is difficult even in four-year colleges. In two-year programs, where many students have not had freshman composition and the instructor must also review the basics of sentence structure, paragraph development, and organization, it may be impossible.

When instructors can spend only two weeks on the report unit,[1] to assign a full-fledged report requiring original or library research, eight to ten pages of text, title page, letter of transmittal, table of contents, abstract, and appendices is to court disaster. One way to achieve most of the goals of the traditional report unit while avoiding many of the headaches is to assign a minireport.

Rationale and Definition

The minireport reduces the time instructors and students in two-year programs must spend on reports by stripping the assignment of those portions that merely duplicate what students have already learned in other assignments, and focusing on those portions where the application of new skills justifies making the report a separate assignment. These new areas not covered by other parts of a basic course in business and technical writing include (1) report format (providing front matter, headings, and appendices), (2) organization (arranging large amounts of information and data effectively), and (3) logic (proving a thesis). While all of these are illustrated in the body of a report, all of them can be learned by writing (and evaluated by reading) only the front matter of a report. Accordingly, the minireport consists of only four items: (1) title page, (2) letter of transmittal, (3) table of contents (list of illustrations may be included), and (4) summary abstract.

The title page is simply a matter of format. The letter of transmittal combines format, style, audience adaptation, and a summary of the report's results. The table of contents lists all subjects that will be discussed in the report, demonstrates its organization, and lists graphic aids and appendices. The summary abstract sets forth the logical structure of the report, the proof of the thesis.

To create minireports, therefore, students must do much of the planning and all of the organizing necessary for a full-fledged report. They are spared the details of research techniques and footnoting (which are covered in advanced courses at four-year colleges in subject matter areas and in report writing) and the work of writing and typing a twenty-page opus. Instead of degenerating into questions of transitions and subject-verb agreement, the minireport allows both students and instructor to focus almost exclusively on aspects of format, organization, and logic.

Making the Assignment

Because the minireport is radically different from "complete" assignments, it's a good idea to give students a written assignment sheet and to go over it thoroughly in class. The one I've developed is shown below, and these are the points I reinforce in class.

First, students may adapt a paper they've done for a marketing or engineering class (even for sociology or freshman composition). However, they will almost always have to rethink the paper before using it for the minireport. They may need to reorganize material and expand or limit the focus. Simply extracting or extrapolating a table of contents from a paper written for another course almost never works.

Second, the minireport must solve an organizational problem, not merely evaluate an action already taken. Many papers for other classes can be salvaged by reversing time. A student who has written a paper explaining why a roof collapsed or a plane crashed may be able to use that knowledge to write a minireport recommending a construction method for a proposed roof or plane, pretending that the decision is in the future, not the past. Other papers can be adapted by assuming that a bill is before the House or Senate, and that the student is a legislative aide who has been asked to prepare a report telling the member of Congress or the Senator how to vote on that bill. These bills may be real or fictional.

The report problems in the text can also be used as sources for minireports, but allowing students to choose their own topics makes the assignment more interesting and reduces plagiarism, since all students are not doing the same problem. However, some students will not have other papers they can adapt, so it is essential to provide a problem they can use. The best problems are those that do not overwhelm students with details, but instead provide ten or twelve conclusions that students must organize and for which they can supply supporting evidence and graphics.[2]

Third, since the student's grade depends solely on the four parts of the minireport, these must be correct and complete. Faulty format on a title page, an incomplete table of contents, or an inadequate abstract can sometimes be redeemed by a strong report body, but the minireport eliminates this back-up. Since students are not writing the report body but only the front materials, it is essential that their headings be clear and their abstracts convincing.

Minireport Assignment

The minireport will consist of

Title Page
Letter of Transmittal
Table of Contents
Table of Illustrations (optional)
Abstract (must be summary abstract)

You may use the report problem in the textbook or a paper you have done for another class. If you choose the latter option, you will need to make *major* revisions and *additional* assumptions to make your paper fit this assignment.

Your report must recommend to somebody (person or organization) that some specific action be taken to solve a specific problem or answer a specific question.

As a student, you may be assigned "analysis" term papers or reports, where your purpose is to explain why something happened, why a policy succeeded or failed. Business reports are rarely of this sort. (The major exceptions are closure reports prepared by engineers in the Research and Development Divisions of large corporations. At the end of each project, they write a report summarizing what was done, stating whether or not the goals were achieved, and making recommendations for further action, if any. You will not be writing a closure report.)

Instead, business reports are normally written because somebody wants to know what to do to solve a specific problem. That is, reports are usually written to recommend a course of action, not to evaluate a course of action already taken.

Therefore, to use another paper as the basis for your minireport, you will need to assume that some organization has a problem which it has asked you to solve. Your report would contain an analysis of the problem, its causes, its impact; a thorough discussion of possible alternatives, their advantages and disadvantages; and a rationale for the alternative you recommend as the solution to the problem. Your report would need to answer all the questions the reader might have; it would need to show how any obstacles to the solutions you urge could be overcome. Your minireport will be a persuasive report.

Since you are not writing the full report for this assignment, but only the report elements listed above, it is essential that your table of contents be complete. Normally, the table of contents you prepared for an earlier paper will not be adequate because it will not cover all the subjects necessary to analyze the problem this specific organization faces and all the aspects of the solutions it should consider. You will need to make additional assumptions, using the knowledge gained in writing the paper for your other class, to write an adequate table of contents. Your table of contents will probably be at least a full page; it may be two or more pages. If a topic is not listed in your table of contents, I will assume you do not plan to discuss it in your report.

Your table of contents must have at least two levels of headings. In addition, you must list appendices, charts, tables, graphs, or other aids for the reader. These must have specific titles, e.g., "Cost of Gasoline, 1970-80," not just "Figure 1." Appendices are listed in the table of contents. Charts, graphs, and other aids placed in the body of your report are listed in a separate list of illustrations. If both the table of contents and the list of illustrations are short, they may go on the same page, as two separate lists.

Scheduling Class Time

Instructors who assign minireports need to spend only five fifty-minute class periods on the report unit.

Day 1. Explain the minireport assignment.

Briefly discuss all the parts of a formal report.[3] Although students will not be writing the entire report, they need to know all the parts to construct tables of contents.

Explain format for the title page in detail; show examples of title pages.

Explain format, organization, and style for the letter of transmittal in detail; show several examples.

Day 2. Define descriptive and summary abstracts. Show several examples of each and give students general guidelines for preparing them.

Distinguish between topic and sentence outlines and explain the relationships between the two kinds of outlines and the two kinds of abstracts. Many students are unaware of all the differences between the two kinds of outlines. A topic outline, in addition to using words or phrases rather than complete sentences, lists all the topics which the report discusses, including Introduction, Background, etc. A sentence outline, on the other hand, includes only the logical structure of the report; it omits introductory and background information. Furthermore, a sentence outline, unlike a topic outline, is headed by the thesis sentence or recommendation. A topic outline will yield a descriptive abstract and the table of contents; a sentence outline will yield a summary abstract.

Day 3. Explain how to set up various levels of headings.

Explain acceptable layouts for the table of contents; show examples of each. Explain the relationship between various levels of headings, levels in the outline, and indentation in the table of contents.

Explain acceptable layouts for the list of illustrations.

Explain in some detail various methods of organizing the body of the report—chronological, logical, and psychological—and discuss the advantages and disadvantages of each.

Day 4. Go over the report problem in the text in detail, helping students to organize the material, to identify the necessary supporting material, and to suggest specific graphics and appendices that would help the reader. Even in a report problem of only moderate complexity, this discussion will take a full period. If more than five class periods are available for the report unit, it's a good idea to have students work on these questions in small groups and then get together to share their conclusions. This method increases student participation and probably improves learning, but substantial instructor guidance will still be required to help students come up with specific subheadings and titles for graphics.

Day 5. Ask students to write both summary and descriptive abstracts in class, either of the report problem or of a short article.[4] Even after seeing examples, students find it very hard to distinguish between summary and descriptive abstracts. Since the summary abstract is an important determinant of the minireport grade, it's a good idea to give students a chance in class to find out whether they understand the difference between the two kinds of abstracts. Since students will not be able to write both abstracts in one fifty-minute period, ask some of them to write summary abstracts and others to write descriptive abstracts. Have a few of each read aloud at the end of the period and give the class immediate oral feedback.

Review the key points of the assignment and answer any questions students have. Point out that the minireport assignment involves a good deal of redundancy: the recommendation, for example, will appear both in the letter of transmittal and in the abstract—perhaps in the same words. The language of the transmittal, however, is personal, while the abstract is impersonal.

Conclusion

The minireport requires students to organize information, provide subheads, and indicate the tables, graphs, and appendices that could be used if they were writing full reports. The minireport enables students in two-year programs to demonstrate their mastery of report format, organization, and logic without actually writing a full and lengthy report.

Notes

1. Spending more than two weeks on the report unit in a basic business and technical writing course is hard to justify, since the other kinds of writing covered in the course will be of more immediate pragmatic value to the students. In a recent survey of both business executives and faculty members at a four-year university, Donna Stine and Donald Skarzenski asked, "What kind of writing do your employees do most often (will your students do most often) after graduation?" Out of 20 listed forms of writing, business executives ranked technical reports 13.6 and long reports 15.3. Professors thought these were much more common, rating technical reports 9.0 and long reports 11.1. Reported in "Priorities for the Business Communication Classroom: A Survey of Business and Academe," *The Journal of Business Communication* 16 (Spring 1979): 17–18.

2. For a sample assignment, see Problem 78, Francis W. Weeks and Kitty O. Locker, *Business Writing Cases and Problems* (Champaign, Ill.: Stipes, 1980), 135–38.

3. If the text you use does not discuss formal reports, you can obtain information about report format from Raymond V. Lesikar, *Report Writing for Business*, 6th ed. (Homewood, Ill.: Richard D. Irwin, 1981) or Kenneth W. Houp and Thomas E. Pearsall, *Reporting Technical Information*, 4th ed. (Encino, Calif.: Glencoe, 1980).

4. An excellent exercise is found in Carla Butenhoff, "Bad Writing Can Be Good Business," *The ABCA Bulletin* 40 (June 1977): 12–13.

22 The Poster Session: An Alternative to the Oral Report

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The poster session is an alternative to the traditional oral report in technical writing classes. Each student investigates a topic in his or her particular discipline and prepares a large poster containing graphical material that correlates with a brief text. Posters are set up on easels in college corridors during the class period and lunch hour, with students in attendance to encourage questions and to provide answers. The poster session offers valuable experience in research, summary, layout, and delivery. Immediate feedback is provided from the audience of faculty and students. Most important, the poster session provides an opportunity for students to present technical information to a varied audience.

Students in two-year colleges usually plan to enter the business world within a few years. They look to the technical writing teacher for practical instruction of value to their immediate careers. Since many of their communication tasks will involve presenting information orally—for example, briefing colleagues at the end of a shift or giving a short speech at a workshop—many teachers ask students to give an oral report to the class; often a summary of the research paper is the assigned topic. An alternative is offered by the poster session.

What the Poster Session Is

The poster session is a technique for communicating technical information that combines visual, oral, and written presentations. Inspired by similar sessions at engineering, physics, and mathematics conferences,[1] the poster session is, in essence, a research paper compressed to a single large (approximately 3½′ × 5′) chart and presented to the public. The success of the poster session depends upon three steps: preparation, organization, and presentation.

Preparation

Poster session assignments must be chosen carefully, for topics should lend themselves to graphical presentation rather than lengthy description or argument. Suitable topics include recent developments in a student's technical field (for example, extracting energy from hot rock or reclaiming land after strip mining) or problems important to society (for example, the greenhouse effect). Less suitable are feasibility studies or topics requiring thorough examination of alternatives.

With the topic selected, students begin gathering material. While many of them know to check the card catalog and the *Readers' Guide to Periodical Literature*, the technical writing teacher may need to steer them to such specialized indexes as the *Applied Science and Technology Index*.

Organization

Organizing the data is undoubtedly the most difficult part of the poster session. An essential first step is to determine the main idea to be presented on the poster. This idea is then illustrated graphically, confirmed in a title, and condensed in a simple text that the audience can easily follow.

Since the graphics are the first elements to catch the eye, they should immediately clarify the main idea. Lengthy tables, schematic diagrams, and graphs with complicated keys are generally too detailed for this purpose. Original photographs can be effective, but reproducing them may present problems. Drawings with bright color, bold lines, and large lettering are preferable. A single drawing may be placed in the center of the poster, with surrounding callouts; or the poster may be divided into parts, with a large drawing on one panel and a smaller sketch on another. In any case, the student should strive for an uncluttered effect.

The title confirms the theme of the graphics. Centered at the top of the poster in large, bold capitals, it provides a general—rather than a complete—description of the poster contents. A good title should be limited to one line and should avoid unnecessary words like "An Illustration of a . . ." Most important, it should motivate the viewer to look to the text.

The text itself plays a vital role. Overemphasis on pictorial aspects reduces the poster session to mere display, yet too much text loses the viewer. Blocks of text should be small and separated by ample "white space." "Bullets" may be used to mark major points and longer discussions may be split above and below a drawing. Information should be presented in short sentences to promote easy reading. Students who have been encouraged to produce a low Fog Index will appreciate this practical application.

On a typical poster, for example, a student writing about geothermal energy might present two panels: on the left, a cutaway view showing an underground thermal reservoir; on the right, a map highlighting areas where geothermal energy is being exploited. Text above the map discusses the need for energy sources, while text below discusses the potential uses of that energy in the twentieth century.

As a complement to the poster itself, students need to compile and organize additional information that the audience may request. Because that audience includes administrators, teachers, students, and staff, this is no easy task. Students may be called upon to supply facts ranging from cost to technology to societal effects. Such information is best presented from memory, but note cards outlining main points and including supporting data enable students to answer questions accurately and to handle the poster session with confidence.

Presentation

Communicating the information gathered is, of course, the main purpose of the poster session. The posters are set up on easels or freestanding bulletin boards in the corridor of the science building, where they attract students and faculty passing between classes. The technical writing students responsible for the posters stand by their exhibits, volunteering information, explaining the purpose of the poster, and answering questions. This is by no means a passive activity. Indeed, the poster session has much in common with a teaching session. Just as the textbook is not a substitute for the teacher, the poster is not a substitute for the student. An effective session requires both posters and "teachers" working together to inform the audience. As with any good teaching session, there is interaction with the audience. Information not completely presented on the poster is clarified and new viewpoints are suggested. Students gain valuable feedback on how to improve their work.

The poster session should last at least an hour—the class period. An additional hour at lunchtime allows students to converse with those unable to view the posters during the class hour.

What the Poster Session Is Not

The poster session should not be confused with an oral report, a much more traditional assignment. The oral report has a captive audience—usually the students in the class, who are required to sit and listen. The poster session, on the other hand, must capture a transient audience by means of eye-catching material. Further, the oral report is generally limited to ten minutes to allow each member of the class a turn; the poster session has no such constraint. Should a viewer wish to discuss the details of a particular poster, the student is free to comment for ten minutes or thirty minutes or an hour.

What the Poster Session Does

The elimination of the usual time restraints is only one of several benefits of the poster session. Students receive valuable experience in research, summary, layout, and delivery—all skills that will be needed in company briefings, in seminars, in memos, and in reports. Consequently, students complete the poster session convinced that they have learned a practical approach to technical communication, not simply a classroom exercise.

Notes

1. Poster sessions were held recently, for example, at the SIAM 81 National Meeting and at the Summer 1981 Gordon Conference on Three-Body Problems in Chemistry and Physics, Wolfboro, New Hampshire.

23 The Importance of Summaries and Their Use in the Applied Writing Class

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The use of summaries in business and technical writing has increased markedly because of the proliferation of information that busy executives, administrators, and technicians must absorb and convey. The extensive use of summaries in the professional world means that summarizing is a basic skill to be stressed in applied writing courses. Furthermore, summary writing is an excellent way to teach careful reading and accurate, concise, and logical writing. Four summary-writing assignments are described.

The use of summaries in business, scientific, and technical contexts is by no means a new phenomenon. Those of us who teach applied writing have long been familiar with the summary as a means of giving readers quick, accurate overviews of widely varied bodies of information. With the information "explosion" of recent years, however, the use of summaries has become more and more prevalent—certainly more prevalent than indicated by the attention given summaries in most business, professional, and technical writing texts. In order for the business and professional world to operate smoothly, today's professionals simply must write clear, accurate, concise summaries about what they do. Similarly, they must have access to the same kind of condensed overviews of other facets of their organization's operation, of their organization's relationships with other organizations and the government, and of the national and local economic and political pictures. Often they must go beyond these summaries to examine the details directly, but they first must know what is going on and where to find additional information. This is the essential role the summary performs.

My awareness of the current heavy reliance on summaries comes from a survey (supported by Auburn University's grant-in-aid program) Steve Gresham and I recently completed. In response to our request for *sample reports*, companies sent over 1,200 reports, many of which were summaries or contained summaries. The summaries covered a wide variety of topics and were directed to particular individuals and groups within a company as well as to people outside a company. For example, we received not only several of the now much talked about "Executive Summaries" of long technical reports but also many other summaries obviously designed to inform the busy executive about corporate developments, government policy changes and their impact on business, pending legislation, economic trends, and even general news items. Other summaries (for example, market conditions, new product ideas, workshops, meetings, surveys, and various completed tasks) were intended for consumption by top executives as well as by employees in supervisory or administrative positions. Many analytical reports—both long and short—were accompanied by cover letters (often written by someone other than the author) that were comparatively long and evaluated as well as summarized. Reports directed to all employees or to the general public included summaries of policies, procedures, news items, and safety records. Of particular interest were position papers written to summarize and clarify company views of pending legislation and other issues of local and national importance. And of course we received many special and standard periodic reports—production, sales, activity, and progress reports—all of which are basically summaries.

The Value of Assignments That Require Summaries

Summaries in professional writing are extensively used not only as reports in themselves but also as a generic part of almost every report. The art of summarizing is indeed a basic skill in writing—especially applied writing. Consequently, I have begun to spend more time in my courses emphasizing the uses of summaries and have added assignments that require students to write summaries of various lengths. Students usually respond well to these assignments because I can unequivocally say that, based on my research, business, scientific, and technical professionals write summaries in various forms more frequently than any other type of report *throughout their careers.* In addition to this interest-attracting relevance with its obvious benefits, exercises requiring summaries offer several other pedagogical advantages.

First, summary-writing exercises require students to *read* carefully and critically (a habit that, regrettably, many have not yet learned). In order to write a clear, accurate summary, students must watch for important details and discover the organizational structure of whatever they condense. Once these skills are acquired, students can transfer them to their own writing, organizing reports more logically and placing important details more effectively within them. The critical eye students develop as they practice reading to summarize begins to function almost automatically whenever they read or write.

Second, summary-writing exercises teach students to *write* concisely, accurately, and clearly. Since summaries are usually fairly short writing assignments, a number of them can be required without creating an inordinately heavy burden on student or instructor. The more individual assignments students write and receive feedback on, the more they learn about the strengths and weaknesses of their writing. Furthermore, summaries lend themselves to accurate, constructive criticism. For example, the attentive instructor can quickly see whether a student has reading problems. The student's failure to grasp the purpose, structure, and details of what he or she has read is easily seen and, more important, easily demonstrated to the student. Summary-writing assignments also offer an effective means of revealing basic writing problems. As might be expected, typical grammar and punctuation errors surface and problems with accuracy are apparent. The inability of students to choose appropriate sentence structures and words is quickly apparent when they reduce someone else's presentation of a fairly complex set of facts and opinions to a short paragraph or group of paragraphs expressed in their own words. When these discrepancies are pointed out diplomatically, students recognize that their words and sentences do not faithfully summarize the original; they can then make the changes necessary to produce an accurate summary.

Types of Summaries

In the professional world, and especially in applied-writing textbooks, summaries are given many different names, a circumstance that confuses most students. The most common labels are summary, abstract, synopsis, précis, and epitome; less frequently used options are abridgement, brief (usually reserved for outlines of legal arguments), compendium, and conspectus. Although some writers distinguish among these, in reality the terms are used almost interchangeably, with the exception of *summary*, which has several additional applications. All of these labels, including summary, are used to refer to brief prose descriptions or condensations of the information in longer reports or papers. Although abstracts, synopses and the like rely on other prose works to justify their existence, these condensations are separate entities that appear as parts prefatory to a report or article or as annotations in abstracting journals. Since *abstract* is clearly the most frequently used name for this kind of summary (and we do not have, as several of my colleagues have pointed out, "epitomizing journals" or "synopsizing services"), perhaps we should strike a blow for clarity and consistency by using only the word *abstract* to refer to a summary of this nature.

Although the word *summary* can be used to refer to what we have called an *abstract,* it is also a broader term used to describe that integral part of a report or paper itself which briefly reviews the major points made in that work or a section of it; furthermore, *summary* is often used to identify an entire report or paper that is a digest of information about a situation or procedure, an action or event. These summary reports are themselves often long enough to justify shorter abstracts that give quick overviews of the information they contain.

Most writers distinguish between two basic types of summaries—descriptive and informative. Although all summaries are either descriptive or informative, these adjectives are most frequently used with the term *abstract.* A descriptive abstract merely explains what a report or article does without presenting the factual information, opinions, or conclusions it contains. What follows is the descriptive abstract of a report on the Memphis economy.

> This report analyzes the Memphis economy in April of 1977 by presenting and evaluating several key economic indicators including unemployment rates, housing starts, retail sales, and financial activity (net loans and savings levels). Figures for April 1977 or for the first months of 1977 are compared with those for the same period in 1976. Also, changes in the economic indicators for Memphis are compared with those experienced in Tennessee and its metropolitan areas.

An informative abstract, on the other hand, goes beyond the mere description of what a report or article does; it summarizes the most important facts in the original and presents its conclusions. The following paragraph is an informative abstract of the Memphis report abstracted descriptively above.

> As of April 1977 the Memphis economy is recovering well from the economic slowdown produced by a severe winter and the economic slump of 1976. Furthermore, almost all of the key economic indicators show that Memphis' recovery is keeping pace with that seen in Tennessee's other metropolitan areas. Unemployment rates are significantly lower than last year's—down 1.7% to 5.3% in Memphis; down 1.8% to 5.8% statewide. In the first five months of 1977 new housing starts were up in both Memphis (21%) and the state (19.5%) over starts for this period in 1976. Despite weak sales

> in January, retail sales for the first quarter of 1977 expanded sharply over 1976 first quarter figures; with a 8.5% gain Memphis was close behind Nashville (up 10%) and Knoxville (up 15%). Financial indicators were virtually parallel statewide and very clearly reveal that people are regaining enough confidence in the economy to put money in circulation; net loans were up 40% over last year's level and savings were down 30%.

Although descriptive abstracts are used primarily as annotations in abstracting journals, informative abstracts are widely used in business and technical writing since the people who need summaries are more concerned with the facts and conclusions in a report than with a description of the report itself.

Assignments

Assignments that require students to produce summaries are fairly easy to develop and are limited only by the resources and time you have available. The following assignments suggest some of the many ways summaries can be incorporated into applied writing courses.

Pure Summaries

"Pure" summaries like those described below are good beginning exercises because they allow the instructor to diagnose and correct reading and writing problems.

Summary of a short essay. Collections of essays on the basic principles of business, economics, science, or technology are good sources in which to locate clear, professionally written essays to use in this assignment. Choose an essay or coherent portion of an essay that relates to an area of business, science, or technology your students know fairly well. Then ask them to write a summary of it. In this as in all "pure" summary assignments, it is wise to prescribe a specific length for the summary. You might use several assignments of this nature during a course, moving from simpler to more complex essays.

Summaries of news items. Select a news article or group of news articles dealing with a current issue facing a particular segment of the business, scientific, or technological world. Newspapers, weekly news magazines, and the more general, "newsy" professional journals are good sources. Ask students to write a memo to you summarizing the facts and opinions they find in the articles. This assignment interests students because it allows them to deal with current, "real" information and because it requires them to undertake an assignment that is frequently requested in the professional world. Emphasize that this kind of summary is one very important way busy executives have of keeping up with developments on a broad front. Again, choose items carefully and specify maximum and minimum lengths for the summary. This assignment is useful in orienting students to some of the techniques they will need later on when they write longer research reports.

Summary of a professional report. Provide each student with a copy of a moderately long (6-12 pages) report on a subject in the student's professional area. Although it will take time and effort on your part to secure these reports, they are the most effective materials for students to summarize because they are the very kind of documents students will later have to write, read, and—emphasize this—summarize. Again set up length requirements that fit the reports you select. Although the temptation will be to give students any reports you can secure, try to locate reports that your students can follow. In addition, volunteer to clarify confusing points in the reports and even be prepared to add data to eliminate ambiguous statements or references.

Summaries as Parts of Evaluation Assignments

I use two kinds of materials—professional reports and articles from professional journals—in the two evaluation assignments. The purpose of both is to get students in the habit of examining the style and organization of the written materials they will be reading all their professional careers. Students fill out a questionnaire that requires them to answer in their own words questions about the style, organization, visual appearance, and overall effectiveness of each report or journal article they read. The emphasis is on a critical response to stylistic and organizational factors; however, as the first step, students write a summary of each item they evaluate. These summaries document that students have read the journal article or report with understanding and provide additional practice in summarizing. Since the strength of the two evaluation assignments lies in having students read, evaluate, and compare a number of reports or articles, the individual summaries cannot be critiqued in as much detail as the "pure" summaries discussed earlier. If you give them some critical attention when grading the evaluations, however, these summaries accomplish almost as much by repetition as the "pure" summaries do by detailed feedback.

The number of reports or articles students are required to read and evaluate for these two assignments must be determined in light of other assignments in the course. Three or four is a minimum for each assignment. I provide a bibliography from which students may choose articles, but they may also read articles of their choice, as long as they are from professional journals. This option encourages students to take a greater interest in the assignment. For the report evaluation assignment, students choose from a number of reports I provide. I encourage them to seek variety in the reports they choose, but give them the freedom to follow their own interests.

Conclusion

The time spent on summary writing does far more than prepare students to perform one specific writing task. Summary-writing assignments improve the ability of students to distill the information they find in any written source. In addition, they help students to improve basic language and organizational skills. Summary writing develops a sense of structure that helps students organize large or small bodies of data logically, and it gives them the practice in careful writing that will help them write concisely and accurately within that logical framework. These assignments are especially valuable for junior college students because the sequence quickly develops, in a realistic context, the basic writing skills these students will be asked to use immediately either in their jobs or in advanced courses of senior college professional programs.

24 Analysis of Professional Periodicals: A Recommendation Report

Stephen Gresham
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Knowledge of the professional literature in their chosen disciplines is a valuable asset for students in two-year colleges. This knowledge should include a careful understanding of the appeal and style of a given periodical and the nature and range of its articles. The assignment described here requires students to review current periodicals critically and to summarize their observations in a report of recommendation.

Technical students should be introduced to the professional literature of their chosen disciplines, and such an introduction can be a profitable part of any course in business and technical writing—in both two-year and four-year colleges. The exercise described here familiarizes students with professional literature and, at the same time, sharpens their report-writing skills.

The exercise begins with the distribution of the following assignment sheet.

Recommendation Report: Analysis of Professional Periodicals

Problem

Someone in your discipline or area of interest is creating a learning resources center. You have been asked to recommend three periodicals to which this new center should subscribe. The only guidelines that you have are that you should select the most useful periodicals available and that you include as much variety as possible. Your recommendation is to be presented in a five- to seven-page report in which you persuasively discuss the appeal, articles, and style of each periodical.

Appeal

Type of periodical (technical, semitechnical, or lay)
Specific audience

- Importance of periodical
- Image of periodical

Articles

- Range of subject matter
- Average length
- Tone
- Particular slant or angle

Style

- Prevailing prose style
- Length and type of sentences
- Vocabulary
- Readability

Suggested Format

Introductory section—an overview of your selections with a brief comment as to why each was selected.

Body—with the periodical's title as the centered heading, a detailed discussion of each selection using the outline given above.

Conclusion—restatement of recommendations and suggested alternatives.

Before discussing the assignment sheet with your students, take a few minutes to remind them of the value of knowing the professional literature in their disciplines. Being aware of this material will be useful in later courses and invaluable to them as professionals attempting to keep abreast of current developments. They may also find a publication outlet for some of their own ideas and thereby contribute to their discipline.

This assignment also provides a convenient lead-in for discussing periodical literature in general, the various guides to periodical literature, and the periodical holdings of your library. The assignment may be complemented with a brief library tour, or you might ask your librarians to talk briefly about the holdings of your library.

At the outset, encourage students to look at as many periodicals as possible so that they will be able to make judicious recommendations. They should look at the more recent issues of each periodical—usually from the past two or three years—and they should examine at least three issues of each periodical.

Then review the assignment outline with students, elaborating on the categories of appeal, articles, and style. The discussion of the appeal of a periodical should begin with a judgement about its type. In general, urge students to classify each periodical as technical (geared to experts and working professionals), semitechnical (geared to an interested audience with some knowledge of the discipline), or lay (geared to an audience with little knowledge of the discipline). Students should then attempt to pinpoint the specific type of audience—academicians, CPA's, etc.—and to assess the importance or function of the periodical. Finally, under the rubric of appeal, the image of the periodical should be described. Is it highly visual with much color and many drawings and photos (signs that it [illegible] directed to lay persons rather than experts)? Or is it less visually stimulating and thus probably more technical?

The second category, articles, is more self-evident than appeal; nevertheless, a few suggestions by the instructor will lead to more effective student reports. For example, as students discuss the range of subject matter of each periodical, they should cite representative article titles and refer to the average length of articles by the approximate number of words (not pages). In contrast to subject matter and length, tone and slant or angle of articles require careful reading. Their discussion of the tone of an article should identify the author's attitude toward the material; their assessment of slant or angle should indicate whether an author held a particular bias in writing the article—a political bias, a pronuclear bias, whatever.

Style, the final category, requires that students determine such features as length and type of sentences and the relative difficulty of the vocabulary in each recommended periodical. What students are really trying to judge here is readability, and they might apply the well-known Gunning Fog Index to each periodical. If they do, issue a warning: the accuracy of any readability formula depends largely on the scope of the sample. Accordingly, students should apply the Fog Index to several passages in each article and to several articles in each periodical under consideration. The figures culled will vary somewhat; however, their main interest is in the average readability figure. A further way to help a reader gauge the readability and prevailing prose style of a particular periodical is to quote a representative passage or two.

Conclude with comments about format. The format suggested on the assignment usually needs little explanation, but there are many ways to alter or expand it. Students generally need two weeks to complete the assignment, and most find it useful and interesting. In fact, this analysis of professional periodicals occasionally puts them on the track of ideas and topics for other exercises and assignments.

Rarely does an assignment apply directly to both the professional interests of the students and to the development of their writing skills; this one seems to. Above all, it requires students to exercise an immeasurably useful facility: reading closely with a discerning eye.

Part Seven: Growing as a Professional

25 Resources for Teachers of Business, Technical, and Vocational Writing

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This bibliography addresses the needs of the teacher of freshman- or sophomore-level courses in practical writing and composition. It covers a variety of resources that contribute both to professional development and teacher preparation: professional organizations, institutes and workshops, journals, teacher preparation material, textbooks, standard reference works, and bibliographies. Annotations provide details on availability, relevance, and applications for each resource listed.

This bibliography was prepared especially to complement the articles selected for this anthology. The bibliography addresses the needs of the teacher of freshman or sophomore courses in practical writing and composition—whether the course is called technical writing, business writing, science writing, or vocational writing. Such courses are taught in two- or four-year colleges, technical institutes, junior colleges, or community colleges.

In preparing this bibliography, we relied on the experience of one of us in preparing two-year college teachers of practical writing and on a bibliography prepared previously by the other of us for teachers in four-year colleges. This work updates, extends, and refocuses that earlier effort—"A Bibliography of Resources for Beginning Teachers of Technical Writing," available in *Technical and Professional Communication: Teaching in the Two-Year College, Four-Year College, Professional School*, edited by Thomas M. Sawyer.

The resources we have gathered are categorized as follows.

Organizations
Institutes and Workshops

Journals
Teacher Preparation Material
Textbooks for Freshman and Sophomore Courses
Standard Reference Works and Resources
Bibliographies

We believe that the information listed in the first three sections directs beginning (and experienced) teachers to the best ways of staying abreast of new work, new techniques, and new resources. In particular, the special institutes and workshops on technical writing are among the best ways for the new teacher to become immersed in the field and for the experienced teacher to become refreshed. Current information on such workshops also appears in the journals and periodicals we have listed.

This bibliography does not, however, include individual journal articles. There are by now far too many to list comprehensively and too many good ones for different purposes to list selectively. Rather, our section on Teacher Preparation Material includes several anthologies of the most useful journal articles; all of these have appeared during the past five years as the need for systematic teacher preparation has become more crucial. In addition, many of these books contain bibliographies directing the reader to more material.

The section on Textbooks for Freshman and Sophomore Courses is completely new. Selection was difficult because of the many fine texts that have recently appeared. Although we may have omitted some deserving books, the thirty-three texts and readers included are representative of the best available as of September 1981.

Our section on Reference Works and Resources lists some time-tested classics and several promising new books. These include texts designed primarily for the four-year or advanced student, handbooks, and professional literature for the practicing communicator. We believe that familiarity with these resources can provide general background on professional needs and practices and specific detail in such special areas of interest as graphic aids, data handling, and instruction or specification writing.

Our final section lists both completed bibliographies previously published and continuing bibliographies that are updated periodically. These should help teachers keep up with current work as well as solve specific resource problems.

Organizations

American Business Communication Association (ABCA). University of Illinois at Urbana-Champaign, 608 South Wright Street, Urbana, IL 61801.

Francis Weeks, Executive Director. Membership: college teachers, management consultants, training directors, public relations writers, others interested in business communications. Cost: $25 per year. Publications: *Journal of Business Communication*, quarterly; *ABCA Bulletin*, quarterly. Annual meeting: December.

Association of Teachers of Technical Writing (ATTW).

John H. Mitchell, President: Department of English, University of Massachusetts, Amherst, MA 01002; Nell Ann Pickett, Executive Secretary-Treasurer: English Department, Hinds Junior College, Raymond, MS 39154. Membership: college teachers, secondary school teachers, technical writers in government and industry. Cost: $6 per year. Publications: *The Technical Writing Teacher*, three times a year. Meetings: in conjunction with MLA, NCTE, CCCC.

Conference on College Composition and Communication (CCCC). 1111 Kenyon Road, Urbana, IL 61801.

Membership: college teachers of composition, technical and business writing, advanced composition. Cost: $8 per year plus $30 National Council of Teachers of English dues. Publications: *College Composition and Communication*, four times per academic year. Annual meeting: March-April.

Council for Programs in Technical and Scientific Communication (CPTSC).

Carolyn R. Miller, Treasurer: English Department, North Carolina State University, Raleigh, NC 27650. Membership: college teachers and program directors, researchers, training directors. Cost: $15 per year. Publications: annual proceedings, program directory, course syllabus collection. Annual meeting: spring.

Institute of Electrical and Electronics Engineers, Group on Professional Communications (IEEE-GPC). 345 East 47th Street, New York, NY 10017.

Membership: technical writers and editors, publications managers, teachers, engineers. Cost: $6 per year plus $20 IEEE dues. Publications: *IEEE Transactions on Professional Communication*, quarterly.

International Association of Business Communicators (IABC). 870 Market Street, Suite 928, San Francisco, CA 94102.

Membership: professionals in corporate communications, public relations, government, sales, publishing. Cost: $55 per year plus local chapter dues. Publications: *IABC News*, quarterly; *Journal of Organizational Communication*, quarterly. Annual meeting: June.

National Council of Teachers of English (NCTE). 1111 Kenyon Road, Urbana, IL 61801.

Membership: elementary, secondary, and college teachers of English. Cost: $30 per year. Publications: *College English*, eight issues a year; *English*

Journal, eight issues a year; *Research in the Teaching of English*, four issues per academic year (membership includes one journal). Annual meeting: November.

Society for Technical Communication (STC). 815 Fifteenth Street NW, Washington, DC 20005.

Curtis T. Youngblood, Executive Director. Membership: technical writers, editors, illustrators, publications directors, teachers of technical communication. Cost: $40 per year. Publications: *Technical Communication*, quarterly; *Intercom*, bimonthly newsletter, annual proceedings, anthologies, handbooks. Annual meeting: May.

Institutes and Workshops

Communicating Technical Information.

Massachusetts Institute of Technology (James G. Paradis). Five-day workshop, summer. Write: Office of the Summer Session, Room E19-356, Massachusetts Institute of Technology, Cambridge, MA 02139.

Institute in Technical Communication (Southeastern Conference on English in the Two-Year College).

University of Southern Mississippi (Nell Ann Pickett and Dixie E. Hickman). Five-day institute, summer. Write: Nell Ann Pickett, Hinds Junior College, Raymond, MS 39154 or Dixie E. Hickman, S.S. Box 9235, University of Southern Mississippi, Hattiesburg, MS 39406.

NCTE Postconvention Workshop.

Annual convention of the National Council of Teachers of English. Three-day workshop, November. Write: NCTE Information Services, 1111 Kenyon Road, Urbana, IL 61801.

The Teaching of Technical Writing.

Southern Illinois University at Carbondale (Vivienne Hertz). Weekend workshop, October. Write: Joe Lynch, Washington Square C, Southern Illinois University, Carbondale, IL 62901.

Teaching Scientific and Technical English to Nonnative Speakers.

University of Michigan (Leslie Olsen and Tom Huckin). Four-day workshop, summer. Write: Barbara Cox, Conference Coordinator, Department of Humanities, College of Engineering, University of Michigan, Ann Arbor, MI 48109.

Teaching Technical and Professional Communication.

University of Michigan (Dwight Stevenson and J. C. Mathes). Five-day conference, summer. Write: Barbara Cox, Conference Coordinator, Department of Humanities, College of Engineering, University of Michigan, Ann Arbor, MI 48109.

Teaching Technical and Professional Communication.

Rice University (Linda Driskill). Four-day conference, summer. Write: Offices of Continuing Studies and Special Programs, Rice University, P.O. Box 1892, Houston, TX 77001.

Teaching Technical and Professional Writing.

University of Washington (Mike White). Five-day seminar, summer. Write: Professor Mike White, Director, Scientific and Technical Communications Program, 14 Loew Hall, FH-10, University of Washington, Seattle, WA 98195.

Teaching Technical and Professional Writing Workshop.

Old Dominion University (Freda Stohrer). Two-day workshop, summer. Write: TTPWW, School of Continuing Education, Old Dominion University, Norfolk, VA 23508.

Technical Writing Institute.

Rensselaer Polytechnic Institute (Frank Hammett). Five-day institute, summer. Write: TWI, Division of Continuing Education, RPI, Troy, NY 12181.

Technical Writing Institute for Teachers.

Rensselaer Polytechnic Institute (David L. Carson). Five-day institute, summer. Write: TWIT, Division of Continuing Education, RPI, Troy, NY 12181.

Journals

ABCA Bulletin.

Published by American Business Communication Association; quarterly. Articles of general interest to teachers and practitioners—assignments, exercises, course outlines.

College Composition and Communication.

Published by the Conference on College Composition and Communication; four times per academic year. Articles on theory and practice of composition and teaching; short articles on specific classroom practices, including technical and business writing.

Journal of Business Communication.

Published by American Business Communication Association; quarterly. Articles on research results, theoretical approaches, and techniques of wide applicability.

Journal of Technical Writing and Communication.

Published by Baywood Publishing Co., 120 Marine Street, Box 609, Farmingdale, NY 11735; quarterly; subscriptions $40. Articles on research, theory, and the profession.

Teaching English in the Two-Year College.

Published by Department of English, East Carolina University, Greenville, NC 27834; three times a year; subscriptions $5.00. A national forum for two-year college teachers; articles on all aspects of English teaching, including technical and business writing.

Technical Communication.

Published by the Society for Technical Communication; quarterly. Articles on all aspects of the technical communication profession—writing, editing, production, management, and teaching.

The Technical Writing Teacher.

Published by Association of Teachers of Technical Writing; three times a year. Articles on technical writing pedagogy—exercises, assignments, programs, and opportunities for the teacher.

Teacher Preparation Material

ABCA Casebook One. Urbana, Ill.: American Business Communication Association, 1973.

Thirty-seven cases presented for classroom use in business communication courses. Supplemented by *ABCA Casebook Two* (1977) containing sixty-eight cases.

Anderson, Paul, ed. *Teaching Audience Analysis.* Morehead, Ky.: Association of Teachers of Technical Writing, 1980.

An anthology of new articles on issues and teaching techniques on the audiences for technical and business reports.

Brown, Michael R. "Writing and Science: A Freshman Course for Science Majors." Paper presented at the annual meeting of the Conference on College Composition and Communication, St. Louis, Missouri, 13–15 March 1975 (ERIC Document Reproduction Service No. ED 103 901).

Describes a freshman composition course wherein students start with technical writing assignments and move toward scientific writing.

Cunningham, Donald H., and Herman A. Estrin, eds. *The Teaching of Technical Writing*. Urbana, Ill.: National Council of Teachers of English, 1975.

An anthology of twenty-four important articles published between 1960 and 1975, covering the central concerns of the teaching of technical and scientific writing; bibliography.

Douglas, George H., ed. *The Teaching of Business Communication*. Champaign, Ill.: American Business Communication Association, 1978.

An anthology of the best recent work from the journals of the ABCA; included are forty articles covering problems of the beginning teacher, course curricula and content, teaching methods and techniques, grading practices, and teaching aids.

English in Texas: Focus on Technical Writing, 11 (Summer 1980).

Nine articles focus on such selected topics in technical writing as persuasive technical writing, visual aids, building a technical writing program, and consulting. Available from Texas Joint Council of Teachers of English, c/o Fred Tarpley, Department of Literature and Languages, East Texas State University, Commerce, TX 75428.

Kirkman, John, ed. *Teaching Communication Skills to Engineers and Scientists in Higher Education*. Cardiff: University of Wales Institute of Science and Technology, 1978.

A collection of twenty-seven articles on the content, teaching methods, and materials in advanced technical writing classes.

Laster, Ann A. "Setting Up and Implementing a Technical Writing Course in the Two-Year College: A Method." Paper presented at the annual meeting of the Conference on College Composition and Communication, Anaheim, California, 6–7 April 1974 (ERIC Document Reproduction Service No. ED 099 876).

Describes a two-semester technical writing course which prepares students for communication skills needed in technical careers.

McGalliard, Roy A., and Ruth G. Fleming, eds. *How Do You Teach Technical Writing?* Proceedings of the Technical Writing Section of the Ninth Annual Southeastern Regional Conference on English in the Two-Year College, Jackson, Mississippi, 21–23 February 1974 (ERIC Document Reproduction Serivce No. 099 844).

Papers discuss the rationale for, the importance of, and teaching methods for technical writing classes.

Pearsall, Thomas E. *Teaching Technical Writing: Methods for College English Teachers.* Washington, D.C.: Society for Technical Communication, 1975.

Brief and inclusive introduction to assignments, activities, and concepts for a standard course; bibliography.

Sawyer, Thomas M., ed. *Technical and Professional Communication: Teaching in the Two-Year College, Four-Year College, Professional School.* Ann Arbor, Mich.: Professional Communication Press, 1977.

An anthology of twenty articles and papers with an introduction by Sawyer. New directions in teaching, including internships, computer-assisted instruction, history, cooperative courses.

Stevenson, Dwight W., ed. *Courses, Components, and Exercises in Technical Communication.* Urbana, Ill.: National Council of Teachers of English, 1981.

An anthology of twenty-one articles offering plans for alternative approaches to the teaching of technical writing, a variety of activities for course units, and numerous short assignments.

Textbooks for Freshman and Sophomore Courses

Adelstein, Michael F. *Contemporary Business Writing.* New York: Random House, 1971. 365 pp.

Especially useful for an introductory business writing course in the two-year or four-year college. Thorough treatment of brevity, vigor, clarity, and style in business communication; numerous editing exercises. (Instructor's manual.)

Barr, Doris W. *Communication for Business, Professional, and Technical Students.* 2d ed. Belmont, Calif.: Wadsworth, 1980. 495 pp.

Especially useful for career students in the two-year college. Highlights include the job package, several chapters on the writing of short and long reports, and a section on case problems for twenty business and professional fields. (Instructor's manual.)

Blicq, Ron. *On the Move: Communication for Employees.* Englewood Cliffs, N.J.: Prentice-Hall, 1976. 272 pp.

Especially useful for two-year students in vocational curricula. Presents the employee-communicator in four consecutive career stages: the job applicant, the new employee, the junior manager, and the small-business owner. Integrates writing and speaking skills. (Instructor's manual.)

Brogan, John A. *Clear Technical Writing*. New York: McGraw-Hill, 1973. 213 pp.

Especially useful as a supplementary text in lower-division writing courses. Using a programmed format, the text zeroes in on achieving effective, clear sentence structure.

Brunner, Ingrid, J. C. Mathes, and Dwight W. Stevenson. *The Technician as Writer: Preparing Technical Reports*. Indianapolis: Bobbs-Merrill, 1980. 231 pp.

Based on systematic procedures for designing technical reports of any type. Many examples of actual reports, with analysis of how design principles apply to specific cases; chapters on layout and visual aids and on oral presentations. (Instructor's manual.)

Carr-Ruffino, Norma. *Writing Short Business Reports*. New York: McGraw-Hill, 1980. 194 pp.

Especially useful for an introductory business writing course in two-year colleges. Text focuses on short, practical, everyday reports most frequently written in business and government. (Instructor's manual.)

Estrin, Herman A. *Technical and Professional Writing: A Practical Anthology*. New York: Preston, 1976. 317 pp.

Especially useful as a supplementary reader for students in business, technical, and scientific writing courses. Essays focus on writing standards and how to meet those standards.

Fear, David E. *Technical Communication*. Glenview, Ill.: Scott Foresman, 1981. 2d ed. 400 pp.

Especially useful for an introductory technical writing course in both two- and four-year colleges. Covers the principles of both written and oral technical reports: planning, organizing, writing, illustrating, and polishing. Features include a handbook, plan sheets, exercises, models, and examples. (Instructor's manual.)

Fear, David E. *Technical Writing*. 2d ed. New York: Random House, 1978. 258 pp.

Especially useful for the two-year college student in technical and business curricula. Chapters on prewriting, technical modes, graphics, letters, and reports. (Instructor's manual.)

Felber, Stanley B., and Arthur Koch. *What Did You Say? A Guide to Communications Skills*. 2d ed. Englewood Cliffs, N.J.: Prentice-Hall, 1978. 320 pp.

Especially useful in a basic communications course for vocational-technical students in the two-year college. Text integrates oral and written communication in both the classroom and on-the-job settings. Content includes effective sentences and paragraphs, letters and reports, and group and mass communication.

Field, John P., and Robert H. Weiss. *Cases for Composition*. Boston, Mass.: Little, Brown, 1979. 256 pp.

Practical writing situations that call for reports, speeches, summaries, biographies, letters, etc. Appropriate for any class in practical writing and general enough for use with freshmen and sophomores. (Instructor's manual.)

Flower, Linda. *Problem-Solving Strategies for Writing*. New York: Harcourt Brace Jovanovich, 1981. 210 pp.

Especially useful text in an introductory writing course. A process-based rhetoric, this book guides the student through the writing process—invention, arrangement, and style—in terms of reader-based prose. Excellent projects and exercises. (Instructor's manual.)

Gieselman, Robert D., ed. *Readings in Business Communication*. Champaign, Ill.: Stipes, 1978. 254 pp.

Especially useful as a supplementary reader in business-technical writing courses. Twenty-five essays run the gamut from the theoretical to the practical. Authors include Gunning, Galbraith, Mencken, and the Royal Bank of Canada.

Hart, Andrew W., and James A. Reinking. *Writing for Career-Education Students*. New York: St. Martin's Press, 1977. 335 pp.

Especially useful for a "traditional" freshman composition course emphasizing career writing or for an introductory technical communication course in the two-year college. Text moves from traditional paragraph and theme development to its application in memoranda, letters, and reports. (Instructor's manual.)

Hatch, Richard A. *Communicating in Business*. Chicago: Science Research Associates, 1977. 348 pp.

Especially useful as a text in introductory business communication courses. Applies theory of communication to writing problems in an analytical, not prescriptive, approach. Treats letters, memoranda, and reports. (Instructor's manual.)

Hemphill, Phyllis D. *Business Communications with Writing Improvement Exercises*. Englewood Cliffs, N.J.: Prentice-Hall, 1976. 278 pp.

Especially useful for a business writing course in the two-year college. Takes theory of communication and simplifies it for practical application in writing effective business letters. Also covers the business report and oral communications. (Teacher's edition.)

Himstreet, William C., and Wayne M. Baty. *Business Communications: Principles and Methods*. 5th ed. Belmont, Calif.: Wadsworth, 1977. 509 pp.

Especially useful for sophomore/junior/senior level courses in business communication. Solid chapters on "communication foundations," letters, reports, and oral communications. Lead questions for the students are a helpful feature.

Houp, Kenneth W., and Thomas E. Pearsall. *Reporting Technical Information*. 4th ed. Encino, Calif.: Glencoe, 1980. 547 pp.

Especially useful for the sophomore or junior level technical writing course. Detailed treatment of researching and reporting technical information. Also covers correspondence, oral communication, and mechanics.

Howard, C. Jeriel, Richard Francis Tracz, and Coramae Thomas. *Contact. A Textbook in Applied Communications*. 3d ed. Englewood Cliffs, N.J.: Prentice-Hall, 1979. 295 pp.

Especially useful for vocational-technical students in the two-year college. Integrates speaking, writing, reading, and listening skills in practical job situations. (Instructor's manual.)

Hutchinson, Helene D. *Horizons: Readings and Communication Activities for Vocational-Technical Students*. Beverly Hills, Calif.: Glencoe, 1975. 325 pp.

Especially useful as a supplementary reader in a vocational-technical communication course in the two-year college. This anthology presents a potpourri of essays, fiction, poetry, advertisements, etc., to enhance the student's sense of self, communication, and work.

Lannon, John. *Technical Writing*. 2d ed. Boston: Little, Brown, 1982. 623 pp.

Especially useful as a comprehensive text for technical writing in the two-year college.

Laster, Ann A., and Nell Ann Pickett. *Occupational English*. 3d ed. New York: Harper & Row, 1981. 449 pp.

Especially useful for two-year college students in occupational education. Noted for its specific chapter objectives (for the student), clear explanation and examples, and plan sheets, this text covers various rhetorical patterns, letters, reports, and the library paper. (*Occupational English* is an abbreviated version of Pickett and Laster's *Technical English: Writing, Reading, and Speaking*.)

Leonard, Donald J. *Shurter's Communication in Business*. 4th ed. New York: McGraw-Hill, 1979. 563 pp.

Especially useful for sophomore/junior/senior level courses in business communication. Four sections present the principles of business communications, types of letters, memoranda and reports, and nonwritten aspects of communication. Also has cases, exercises, and handbook. (Instructor's manual.)

Maimon, Elaine, and others. *Writing in the Arts and Sciences.* Cambridge, Mass.: Winthrop, 1981. 330 pp.

Especially useful for the freshman composition course where an emphasis on cross-disciplinary writing is desired. The text covers writing for the humanities, the social sciences, and the natural sciences.

Pearsall, Thomas E., and Donald H. Cunningham. *How to Write for the World of Work.* New York: Holt, Rinehart & Winston, 1978. 369 pp.

Especially useful for students in two-year colleges and preprofessional university programs. Emphasizing day-to-day writing tasks, this text covers correspondence and reports; oral reports also treated. (Instructor's manual.)

Pickett, Nell Ann. *Practical Communication.* New York: Harper & Row, 1975. 259 pp.

Especially useful for career students in the two-year college. Seven chapters (also available as separate modules) cover analysis, description reports, letters, library research, graphics, and oral communication. Practical career-related writing assignments.

Pickett, Nell Ann, and Ann A. Laster. *Technical English: Writing, Reading, and Speaking.* 3d ed. New York: Harper & Row, 1980. 580 pp.

Especially useful for two-year college students in occupational education. This text is similar to the authors' *Occupational English,* 2d ed., with the addition of a handbook and selected readings. (Instructor's manual.)

Roberts, Louise A. *How to Write for Business.* New York: Harper & Row, 1978. 289 pp.

Especially useful for an introductory course in business writing. Divided into three parts, the text emphasizes achieving clear sentences, organized paragraphs, and effective formats for memoranda, letters, and reports.

Sparrow, W. Keats, and Donald H. Cunningham. *The Practical Craft: Readings for Business and Technical Writers.* Boston: Houghton Mifflin, 1978. 306 pp.

Especially useful as a supplementary reader for two- or four-year college students in business or technical writing courses. The twenty-eight articles address the importance of writing, style, rhetorical strategies, letters, and reports. (Instructor's manual.)

Swanson, Richard. *For Your Information: A Guide to Writing Reports.* Englewood Cliffs, N.J.: Prentice-Hall, 1974. 148 pp.

Especially useful as a supplementary text for report writing courses in two-year colleges. Briefly treats report format and organization, graphics, and oral presentation. Specific assignments by special field: auto mechanics, business, civil/electronics/mechanical technology, and nursing.

Weeks, Francis W. *Principles of Business Communication.* Champaign, Ill.: Stipes, 1973. 134 pp.

Especially useful as a supplementary text in beginning business communication courses. Provides an insightful overview of business writing. Designed for use with a full-length text and with a casebook.

Weeks, Francis W., and Richard A. Hatch. *Business Writing Cases and Problems: Letters, Memorandums, and Reports.* Champaign, Ill.: Stipes, 1977. 116 pp.

Especially useful as a supplementary book in freshman and sophomore business writing courses. The eighty-nine cases require students to think through business problems and provide practice in business writing.

Weisman, Herman N. *Technical Report Writing.* 2d ed. Columbus, Ohio: Charles E. Merrill, 1975. 512 pp.

Especially useful for introductory technical writing courses in the four-year college. Text focuses exclusively on the technical report. (*Technical Report Writing*, 2d ed., is an adaptation of Weisman's *Basic Technical Writing.*)

Standard Reference Works and Resources

Andrews, Deborah C., and Margaret D. Blickle. *Technical Writing: Principles and Forms.* 2d ed. New York: Macmillan, 1982.

One of the newer texts, based on rhetorical principles; major sections are evidence, expression, forms, mechanics.

Brusaw, Charles T., Gerald J. Alred, and Walter E. Oliu. *Handbook of Technical Writing* and *The Business Writer's Handbook.* 2d ed. New York: St. Martin's Press, 1982.

Similar handbooks, differing primarily in examples. Alphabetical entries range from abbreviations, abstracts, and analogy to trip reports, voice, and who/whom. Both books include checklist of writing process, topical index, and bibliography.

Colby, John, and Joseph A. Rice. *Writing to Express.* Minneapolis: Burgess, 1977.

Gives insight into writing situations in "the organization." Chapters on gibberish, phrasing, paragraphing, editing, and formats.

Council for Programs in Technical and Scientific Communication. *Directory of Colleges and Universities: Degrees in Technical and Scientific Communication.* [Houghton, Mich.: Michigan Technological University], 1979.

Descriptions of degree programs at seventeen institutions, including requirements and course descriptions. Available through membership in the CPTSC.

Council for Programs in Technical and Scientific Communication. Proceedings of annual meetings. Available through membership in the CPTSC.

Current issues and approaches in program planning, course design, internships and cooperative programs, applications of computers, communication theory.

Eisenberg, Anne. *Reading Technical Books.* Englewood Cliffs, N.J.: Prentice-Hall, 1978.

Especially for students in two-year technical programs; covers basics of technical reading, how to use a technical book, self-improvement.

Ewing, David W. *Writing for Results in Business, Government, the Sciences, the Professions.* 2d ed. New York: John Wiley & Sons, 1979.

Through a case-oriented approach, explores the writing of reports, memoranda, and letters; also writing for the hard sciences.

Gould, Jay R. *Directions in Technical Writing and Communication.* Baywood's Technical Communications Series, no. 1. Farmingdale, N.Y.: Baywood Publishing, 1978.

An anthology of fourteen essays from *Journal of Technical Writing and Communication.* Intended as an adjunct text in technical writing courses or as a resource for the professional. Covers definition, basic forms, practices, evaluation, and special viewpoints.

Gould, Jay R., and Wayne A. Losano. *Opportunities in Technical Writing Today.* Louisville, Ky.: Vocational and Guidance Manuals, 1975.

Discusses the technical writing profession, qualifications, education and training programs, and job opportunities and salaries in government and industry.

Graf, Rudolf F., and George J. Whalen. *How It Works Illustrated: Everyday Devices and Mechanisms.* New York: Harper & Row, 1974.

Through technical modes and graphics, explains and illustrates how eighty-six mechanisms work.

Huseman, Richard C., Cal M. Logue, and Dwight I. Freshley, eds. *Readings in Interpersonal and Organizational Communications*. 3d ed. Boston: Holbrook Press, 1977.

A collection of journal articles on oral, written, and nonverbal communications arranged under eight headings: communication in general, in organizational structure, in conflict, as motivation and persuasion, in interviews, in small groups, through written-oral methods, and through listening.

Jones, Paul W. *Writing Scientific Papers and Reports*. Revised by Michael L. Keene. 8th ed. Dubuque, Iowa: William C. Brown, 1981.

Consists of instruction in applying rhetorical principles to scientific problems. Covers the basic technical modes, reports, and proposals.

Jordan, Stello, ed. *Handbook of Technical Writing Practices*, 2 vols. New York: Wiley-Interscience; Washington, D.C.: Society for Technical Communication, 1971.

A compendium (thirty-two articles) on the profession, with sections on types of publications, support services, management, and reference works.

King, Lester S. *Why Not Say It Clearly: A Guide to Scientific Writing*. Boston: Little, Brown, 1978.

Drawing from examples from medical journals, points out stylistic strengths and weaknesses; a very personal view about scientific writing.

Koff, Richard M. *How Does It Work?* New York: New American Library, 1973.

Alphabetically arranged entries explain how everyday mechanisms operate. Excellent source for graphics and technical modes.

Lesikar, Raymond V. *Business Communication: Theory and Practice*. 3d ed. Homewood, Ill.: Richard D. Irwin, 1976.

In-depth chapters on communication, style, and business reports; brief treatment of business letters.

Lesikar, Raymond V. *Report Writing for Business*. 5th ed. Homewood, Ill.: Richard D. Irwin, 1977.

Thorough treatment of business report writing. Includes defining the problem and planning the investigation; collecting, arranging, and interpreting the data; constructing the report. Also chapters on graphics and oral presentation.

Mathes, J. C., and Dwight W. Stevenson. *Designing Technical Reports: Writing for Audiences in Organizations*. Indianapolis: Bobbs-Merrill, 1976.

Based on purposes and processes of technical reports, including audience analysis, report design, writing and editing, layout and visual aids.

Mills, Gordon H., and John A. Walter. *Technical Writing*. 4th ed. New York: Holt, Rinehart & Winston, 1978.

One of the classics, aimed primarily at engineering students; covers style, special techniques of technical writing, types of reports, report layout, library research reports.

Monroe, Judson. *Effective Research and Report Writing in Government*. New York: McGraw-Hill, 1980.

A how-to book which guides the professional report writer through each stage of report research and writing: strategies, brainstorming, research design, data collection, analysis, and writing.

Monroe, Judson, C. Meredith, and K. Fisher. *The Science of Scientific Writing*. Dubuque, Iowa: Kendall/Hunt, 1977.

For the scientist who possesses the skills of analysis and organization but who needs to know how to apply them to scientific writing. Chapters discuss the prospectus, the paper, graphics, audience analysis, journal formats, style, and editing and proofreading.

Murphy, Herta A., and Charles E. Peck. *Effective Business Communications*. 2d ed. New York: McGraw-Hill, 1976.

Combines behavioral psychology and communications theory to solve business communication problems; numerous examples and cases.

Sherman, Theodore A., and Simon S. Johnson. *Modern Technical Writing*. 3d ed. Englewood Cliffs, N.J.: Prentice-Hall, 1975.

A standard text, covering style, organization, special techniques, types of reports, business correspondence, handbook of fundamentals.

Society for Technical Communication. Proceedings of Annual International Technical Communication Conference. Washington, D.C.: STC.

Papers on current research and professional practices in four areas: writing and editing, graphics, management, and education and research.

Society for Technical Communication. *Proposals . . . and Their Preparation*. STC Anthology Series, no. 1. Edited by H. Lee Shimberg. Washington, D.C.: STC, 1973.

Articles from *Technical Communication* and papers from conference proceedings on one of the more crucial types of technical writing.

Society for Technical Communication. *Teaching Technical Writing and Editing: In-House Programs That Work*. STC Anthology Series, no. 5. Edited by James G. Shaw. Washington, D.C.: STC, 1976.

Twelve articles and papers cover preliminary considerations, development of training programs, diverse and specialized courses.

Society for Technical Communication. *Technical Editing: Principles and Practices.* STC Anthology Series, no. 4. Edited by Lola M. Zook. Washington, D.C.: STC, 1975.

Articles and papers that present a broad and flexible view of editing; bibliography.

Souther, James W., and Myron L. White. *Technical Report Writing.* 2d ed. New York: John Wiley & Sons, 1977.

Approaches writing as a process: analyzing the problem, studying the alternatives, designing the report, and applying the design. Also defines technical writing and the design approach; covers abstracts and summaries.

Sparrow, W. Keats, and Donald H. Cunningham. *The Practical Craft: Readings for Business and Technical Writers.* Boston: Houghton Mifflin, 1978.

An anthology of twenty-eight articles from professional and technical journals on the importance of technical and business writing, style, strategies, types of reports, and formal elements. Discussion topics and activities for students and suggestions for further reading.

Strong, Charles W., and Donald Edison. *A Technical Writer's Handbook.* New York: Holt, Rinehart & Winston, 1971.

For the practicing professional or the advanced student; covers, in addition to the standard topics, logical and statistical handling of data, displaying data, technical advertising, format for government publications.

Tichy, H. J. *Effective Writing for Engineers, Managers, Scientists.* New York: John Wiley & Sons, 1966.

Detailed and literate, based on years of consulting and lecturing for industry.

Treece, Malra. *Communication for Business and the Professions.* Boston: Allyn & Bacon, 1978.

Written on a highly professional level, blends communication theory with effective speaking and writing skills.

Ulman, Joseph N., and Jay R. Gould. *Technical Reporting.* 3d ed. New York: Holt, Rinehart & Winston, 1972.

A widely used text covering communication principles and procedures, types of reports, writing style and mechanics; appendix of specimen reports.

Warren, Thomas L. *Technical Communication: An Outline.* Totowa, N.J.: Littlefield, Adams, 1978.

An outline, for the beginner, of technical writing basics in prewriting, writing, and postwriting; appendix of readings, samples, and bibliography.

Weisman, Herman M. *Basic Technical Writing*. 4th ed. Columbus, Ohio: Charles E. Merrill, 1980.

In-depth coverage of the scientific method and approach, technical writing and correspondence, report writing and graphics, the technical article and paper, and technical style.

Wilkinson, C. W., Peter B. Clark, and Dorothy C. M. Wilkinson. *Communicating through Letters and Reports*. 7th ed. Homewood, Ill.: Richard D. Irwin, 1980.

Takes a psychological approach to audience analysis and motivation. Covers letters and reports; presents communication problems.

Woelfle, Robert M. *A Guide for Better Technical Presentations*. New York: IEEE Press, 1975.

An anthology of thirty-five reprints from professional journals; covers planning and preparation, visual aids, delivery techniques, multimedia presentations, motion pictures.

Bibliographies

Completed Bibliographies

Balachandran, Sarojini. *Technical Writing: A Bibliography*. Urbana, Ill.: American Business Communication Association; Washington, D.C.: Society for Technical Communication, 1977.

Based on a search covering material published since 1965; items listed by author and annotated; subject index includes references to teaching, techniques, and types of documents.

Blackman, Carolyn M[iller]. "A Bibliography of Resources for Beginning Teachers of Technical Writing." In *Technical and Professional Communication*, edited by Thomas M. Sawyer, 49-64. Ann Arbor, Mich.: Professional Communication Press, 1977.

Includes organizations, bibliographies, articles on teaching, and standard reference works of use to the beginning teacher.

Cunningham, Donald H. "Bibliographies of Technical Writing Material." *The Technical Writing Teacher* 1 (Winter 1974): 9-10.

An attempt to include every published or widely distributed bibliography to date; five books, ten articles.

Cunningham, Donald H. "Books on Police Writing." *College Composition and Communication* 23 (May 1972): 199-201.

Six books are described; more complete listing in Vivienne Hertz and Cunningham's "Bibliography: Police Report Writing." *Police Chief*, August 1971, 44, 49-50.

Cunningham, Donald H., and Vivienne Hertz. "An Annotated Bibliography on the Teaching of Technical Writing." *College Composition and Communication* 29 (May 1970): 177-86.

Entries classified as definitions and distinctions (twenty-four entries), course descriptions and specific assignments (thirty entries), and resource materials (thirteen entries).

Donovan, Robert B. "Technical Writing Texts for Secondary Schools, Two-Year Colleges, and Four-Year Colleges." NCTE Committee on Technical and Scientific Communication, 1977.

Lists fifty-nine primary texts, coded for student level and annotated.

Fearing, Bertie E., and Thomas M. Sawyer. "Speech for Technical Communicators: A Bibliography." In *Proceedings of the 26th International Technical Communication Conference*, V46-50. Los Angeles, 1979.

Cites 131 resources on the oral presentation of technical information. Includes professional organizations, conferences, books, and articles.

Philler, Theresa A., Ruth K. Hersch, and Helen V. Carson. *An Annotated Bibliography on Technical Writing, Editing, Graphics, and Publishing, 1950-1965*. Washington, D.C.: Society of Technical Writers and Publishers; Pittsburgh: Carnegie Library of Pittsburgh, 1966.

Abstracts of 1500 articles and 500 books; permuted subject index, author index, list of periodicals represented.

"Technical Writing." Annotated bibliography. ERIC computer search. Urbana, Ill.: ERIC Clearinghouse on Reading and Communication Skills, 1982. Reprint available from ERIC Clearinghouse on Reading and Communication Skills, 1111 Kenyon Road, Urbana, Illinois 61801.

Contains one hundred citations for project descriptions, position papers, and journal articles on technical writing in the two-year college.

Walter, John A. "Basic Recommended Reference Shelf: A Selected Bibliography of Technical and Scientific Writing." In *Handbook of Technical Writing Practices*, vol. 2, edited by Stello Jordan, 1295-1303. New York: Wiley-Interscience; Washington, D.C.: Society for Technical Communication, 1971.

Lists 143 books with more than nominal merit. Entries classified as encyclopedias and dictionaries; grammar, usage, and style; professional production; technical illustration and graphics; the technical and scientific report; technical writing; readings in technical writing; technical writing casebooks; business letters and reports.

Walter, John A. "Style Manuals." In *Handbook of Technical Writing Practices*, vol. 2, edited by Stello Jordan, 1267-73.

Article on uses and types of style manuals with representative list of general, institutional, and industrial manuals.

Walter, John A. "Teaching Technical Writing: Resources and Strategies." *English in Texas* 11 (Summer 1980): 76-78.

Lists several standard textbooks, collections of articles, supplementary readings, professional societies, institutes/seminars/workshops, and internships and graduate courses in technical writing.

Workun, Arthur E. "Speech for the Technician: A Bibliography." *Journal of Technical Writing and Communication* 4 (Fall 1974): 331-39.

Selected for applicability and timelessness; 179 items, both articles and books.

Continuing Bibliographies

Cunningham, Donald H., ed. Annual bibliography of technical writing, published in each fall issue of *The Technical Writing Teacher*, beginning with vol. 3 (Fall 1975).

Covers books and over one hundred periodicals; entries classified as bibliographies, books, reviews of books, teaching, style, articles and papers, abstracts, proposals, application letters and resumes, editing, graphics, speech, the profession.

Fearing, Bertie E., ed. "Recent and Relevant," quarterly bibliography on technical communication, published in each issue of *Technical Communication*, beginning with vol. 23 (1976).

The Bibliography Committee of the Society for Technical Communication monitors over one hundred periodicals and provides abstracts of articles of interest to the practicing professional; categories include diction, editing, education, management, presentations, printing and production, rhetoric, style, teaching, translation.

Larson, Richard L. "Selected Bibliography of Research and Writing about the Teaching of Composition." May issues of *College Composition and Communication*, beginning with vol. 23 (1972).

Annotated listing of items from the previous year, including significant contributions in business and technical writing. Omits bibliographies, textbooks, teacher preparation, administration.

Contributors

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W. Keats Sparrow has served on the NCTE Committee on Technical and Scientific Communication since 1976. He is coordinator of the Graduate Program for Two-Year College English Teachers at East Carolina University in Greenville and founding editor of *Teaching English in the Two-Year College*.

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Thomas L. Warren, Director of the Technical Writing Program at Oklahoma State University, has published numerous articles in a variety of journals. He has written *How to Write Technical Reports* for the American Management Association and frequently conducts in-service workshops with business, industry, and government on report writing, graphics, and oral communication. He is past chair of the Oklahoma chapter of the Society for Technical Communication and edits the Oklahoma Council of Teachers of English newsletter.

Laura H. Weaver teaches at the University of Evansville in Indiana. She has presented papers on technical writing at the 1982 NCTE Convention and at Interface 1981: Humanities and Technology Conference. The novels and plays of David Storey are a special interest of Professor Weaver and the subject of several of her publications.

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